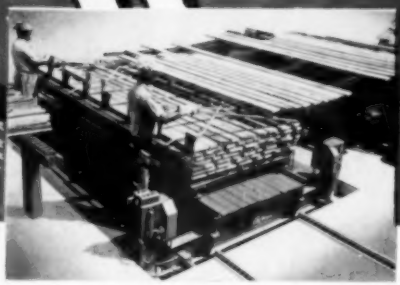
WOOD WORKING Digest



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A HITCHCOCK PUBLICATION

Acceptance under Section 34.64, P.L.&R., authorized

WOOD WORKING DIGEST

222 E. Willow Ave. Wheaton, Ill.

Form 3547 Requested Return Postage Guaranteed

UNIVERSITY MICROFILMS
ATT MR EUGENE B POWER
313 NO FIRST ST
ANN ARBOR R
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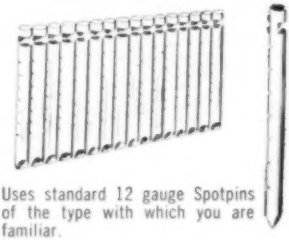
NOW . . . *a complete* PIN SASH in ONE SECOND!

with SPOTNAILS compact automatic set-up

Individual pinning units mount on your own sash clamp. Easily adjustable . . . easily detachable.

Slap your sash—as usual—into your clamp. One pneumatic valve action brings all the heads in over the sash to pin—and to snap back out of the way for easy lift-out of the pinned sash. Simple—uncomplicated.

235 Completed frames before easy reloading of pins. Red light announcement of time to reload.



Uses standard 12 gauge Spotpins of the type with which you are familiar.

Now being used in actual production.

Practical millwork men approve it.

Write for details—and tell us what model sash clamp you use.

Patents Applied For

SPOTNAILS, INC.

Evanston 1, Illinois

New! "OLIVER" Straightline Hydraulic CUT-OFF SAW

Unmatched for smooth, accurate, fast production!

A light finger touch on the large start button moves the saw in a straight line by hydraulic piston. Cuts thousands of pieces without variation of .005 inch. An 18-inch saw cuts 5-inch stock. Cuts stock 20"x2" at 32 strokes a minute, or 16"x 2" at 42 a minute. Carries dado or grooving heads 2" wide on saw arbor.

At all times it operates smoothly with no rebound. It is compact—needs only 18" floor space between wall and rear edge of table. A 7½ h.p. 3600 r.p.m. enclosed fan-cooled motor is built on saw arbor.

The "Oliver" Hydraulic Cut-Off Saw is a perfect unit for a conveyorized rough mill production layout.

"Oliver" also makes the popular No. 94D Cut-Off Saw and the No. 94AD for straight line and angle cuts.

OLIVER

• *Write today for Bulletin No. 94-DH*

OLIVER MACHINERY COMPANY

Established 1890 **GRAND RAPIDS 2, MICHIGAN**

THE SMITH

ENDLESS BED SANDER

WITH SELF-OSCILLATING DRUMS
AND VARIABLE SPEED DRIVE, 12'
TO 35' PER MINUTE

The self-oscillating mechanism (Patented) is the greatest improvement in drum sander construction in many years. Eliminates the multi-jointed, old style oscillator, with its bulky cover and separate motor drive. Operator now can get close to the machine for changing paper, making change in less than five minutes.

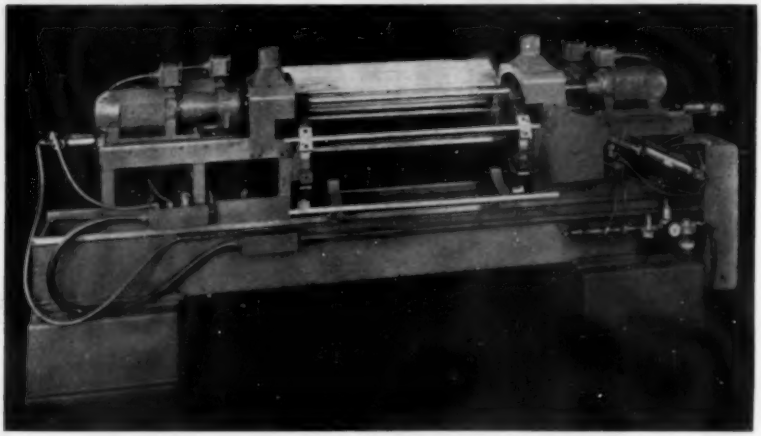
AND YOU CAN ARRANGE FOR A 5 YEAR LEASE, TOO!

Write today for descriptive literature

H. B. SMITH MACHINE CO.

SMITHVILLE, NEW JERSEY

HAWKER'S new ROTARY FEED MULTI-PURPOSE MACHINE TOOL



Do any 6 of these operations in one pass through a Hawker!

(more with dual-purpose chucking heads)

CUT TO LENGTH
CROSS-BORE
BORE
COUNTER-BORE
TAPER
TENON
SLOT ENDS
THREAD EXTERNALLY
THREAD INTERNALLY
ROUND ENDS

Six operations automatically

on each workpiece in one pass through the machine. Rotary feed to chucking heads means "no lost travel time." Chucking heads work continuously.

Round, square, rectangular stock

automatically hopper fed. Positive centering of workpiece. No improper or off-center chucking. Production up 2,500 units per hour.

Standard chucks—minimum set-up time

lets you use standard chucking heads—individual chucking head motor mounts are interchangeable for quicker set-up—faster alignment for changes in operation.

Get in touch with Hawker today!

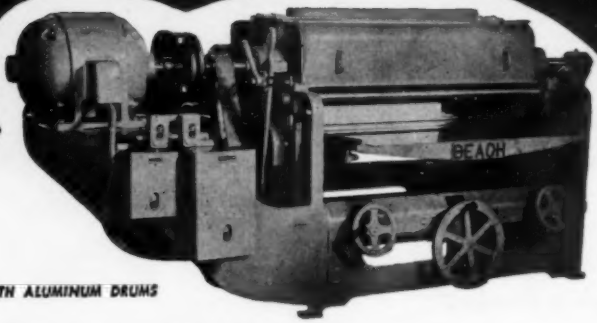
for the full story on this and other new Hawker production machine tools for the woodworking industry.

HAWKER MANUFACTURING CO.
1449 KEOWEE ST., DAYTON 4, OHIO

MACHINES FOR THE NEW AGE OF WOOD

BEACH

TWO DRUM SANDER



WITH ALUMINUM DRUMS

This new model BEACH SANDER combines many quality features and is adaptable to all types of drum sanding. Its simplicity of design cuts upkeep expense. Aluminum drums help give a fine finish.

Install a BEACH SANDER for easy operation and positive power feed. Write for complete details.

Beach MANUFACTURING CO.
MONTROSE, PENNSYLVANIA

WOOD WORKING Digest

OCTOBER, 1954
Vol. 56, No.10

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Art Director

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Are listed on page 128

MEMBER
BPA

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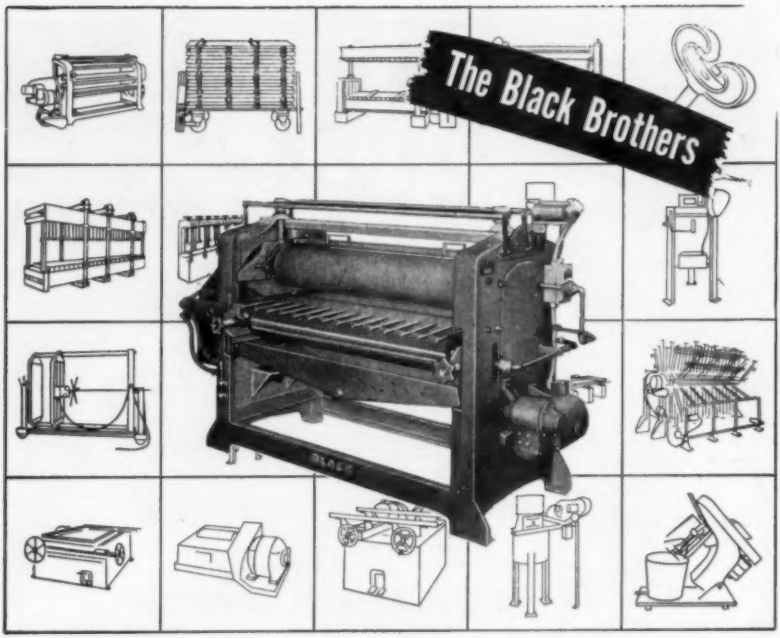


A Complete Line of Laminating & Gluing Equipment

Black Brothers manufacture a complete line of laminating and gluing equipment of nationally recognized superiority. Illustrated above is a No. 22-D resilient roll, ball bearing glue spreader equipped with water cooled doctor rolls as an optional extra for use with quick setting glues. Gluing rolls are deeply covered with fine synthetic rubber, and are specially grooved to control the amount of resins deposited and to conform to irregularities in the veneer. Accurate, heavy duty ball bearings are sealed to keep lubricants in, and dirt and glue out. Black's 22-D Spreader for resins, casein, and other cold glues is unmatched in speed, economy, accuracy, cleanliness and quality production. Write for details today . . . or let us send you a catalog on the complete Black line.

"If It Is Gluing Equipment - We Have It"

THE BLACK BROTHERS CO., INC.
MENDOTA, ILLINOIS, U. S. A.

NEW snap-action fastener for Duncan Phyfe type legs

Permits K-D shipment up to 7 tables in space of 1

ECONOMICAL • STRONG
COMPLETELY CONCEALED

Cuts shipping and storage costs • Eliminates breakage in transit • Cuts assembly line and packaging costs Permits dealer or home assembly without tools.

Three specially formed, steel fasteners are screwed to lower end of center post. These are anchored by a steel spider, screwed into bottom of post (see diagram).

A spring steel clip is fastened to each foot and feet are assembled by hooking clip to end of post and snapping foot into place (see photograph).

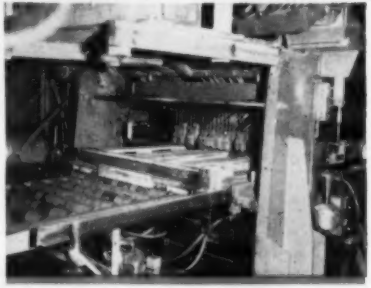
Table top contains a standard TEENUT and simply spins into place on hanger bolt in other end of post. Write for samples and make up a demonstration piece. See how it brings in orders.

UNITED-CARR FASTENER Corp.
31 Ames Street, Cambridge 42, Mass.

MAKERS OF DOT *FASTENERS*

Front view of new Diehl Model #720 HYDRONIC Nailer, in operation at Arkansas Pallet Company. With fully automatic features, HYDRONIC has stepped up pallet production to 800 pallets a day.

Using powered conveyor set in circle through the HYDRONIC, nine men are kept busy loading and unloading. Tenth man is operator.



Back-view of new Diehl HYDRONIC, showing open-back design which permits straight-through feeding, eliminating work-and-turn.

New Diehl Hydronic® Nailer

reduces time and labor costs up to 50%

New Diehl Hydronic® Nailer

reduces time and labor costs up to 50%

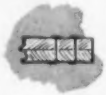
As one of the Nation's biggest producers of quality, low-cost pallets, Arkansas Pallet Company of Pine Bluff, Ark., is constantly looking for *faster, better, lower-cost automatic nailing.*

And as the photos above indicate, Arkansas Pallet has *found* it . . . with the new Diehl HYDRONIC Nailer, which combines automatic Electric Control and Hydraulic Power.

After only six weeks of operation, here is Arkansas Pallet's report on their new Model 720 HYDRONIC: (1) Production has increased substantially, using seasoned oak, driving 14 to 24 nails per stroke with up to 2½" drive-screw nails. (2) Pre-drilling is *eliminated,* yet board-splitting is *much* less than before. (3) Nail-wastage is *also* reduced. (4) Cutput is up to 800 pallets per day!

With the new HYDRONIC, Arkansas Pallet is now able to have a *conveyorized* operation . . . nine men are used to load and unload the HYDRONIC, with a tenth man as operator.

Management opinion? Owners Robin Jordan and Donald Drake say "We're *sold* . . . this machine has the features we *needed* . . . and once personnel are completely familiarized with the new operation, we expect production to hit 1000 pallets a day!"



It will pay *you, too,* to *investigate* the new Diehl HYDRONIC Nailer—to get full *details* on its Electric Master Control Panel that selects nailing combinations, adjusts the table, and actuates the clinching bar and nail hoppers *at the flick of switches* . . . plus the HYDRONIC's smooth, steady Hydraulic Power that *pushes* nails through the wood, *eliminating* pre-drilling and *minimizing* nail-bending and contour driving . . . features that add up to *mass-production* of boxes, pallets, skids, reels, *at less cost per unit with better quality.*

Write to Diehl today—ask for the new HYDRONIC Nailer Bulletin, No. N-454!

Standard of Comparison in the Woodworking Industry

THE G. M.

Diehl

MACHINE WORKS, INC.

WABASH, INDIANA, U. S. A.

for a fabulous finish...

Jewel Brand

ABRASIVE BELTS

For sanding, smoothing, polishing all types of wood products. A grit for every purpose — prompt service on every purchase.

ABRASIVE PRODUCTS, INC.
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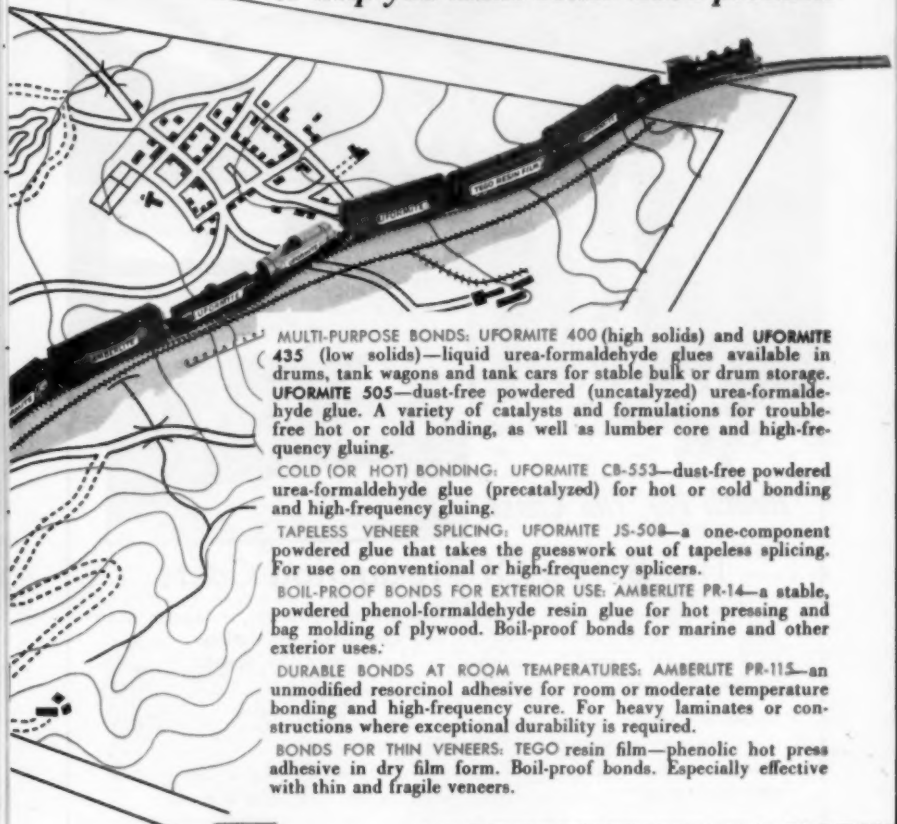
South Braintree 85, Massachusetts

DEPENDABLE ADHESIVES . . .

to help you make better wood products



MULTI-PURPOSE BONDS: UFORMITE 400 (high solids) and **UFORMITE 435** (low solids)—liquid urea-formaldehyde glues available in drums, tank wagons and tank cars for stable bulk or drum storage. **UFORMITE 505**—dust-free powdered (uncatalyzed) urea-formaldehyde glue. A variety of catalysts and formulations for trouble-free hot or cold bonding, as well as lumber core and high-frequency gluing.

COLD (OR HOT) BONDING: UFORMITE CB-553—dust-free powdered urea-formaldehyde glue (precatalyzed) for hot or cold bonding and high-frequency gluing.

TAPELESS VENEER SPLICING: UFORMITE JS-508—a one-component powdered glue that takes the guesswork out of tapeless splicing. For use on conventional or high-frequency splicers.

BOIL-PROOF BONDS FOR EXTERIOR USE: AMBERLITE PR-14—a stable, powdered phenol-formaldehyde resin glue for hot pressing and bag molding of plywood. Boil-proof bonds for marine and other exterior uses.

DURABLE BONDS AT ROOM TEMPERATURES: AMBERLITE PR-115—an unmodified resorcinol adhesive for room or moderate temperature bonding and high-frequency cure. For heavy laminates or constructions where exceptional durability is required.

BONDS FOR THIN VENEERS: TEGO resin film—phenolic hot press adhesive in dry film form. Boil-proof bonds. Especially effective with thin and fragile veneers.

CHEMICALS FOR INDUSTRY

ROHM & HAAS COMPANY

THE RESINOUS PRODUCTS DIVISION

Washington Square, Philadelphia 5, Pa.

Representatives in principal foreign countries

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ROHM & HAAS COMPANY, Resinous Products Division
Washington Square, Philadelphia 5, Pa.

Gen'lemen: Please send me performance and technical data on the following:

- ☐ UFORMITE 400, 435
- ☐ UFORMITE JS-508
- ☐ AMBERLITE PR-14
- ☐ UFORMITE CB-553, 505
- ☐ TEGO dry resin film
- ☐ AMBERLITE PR-115

Name.....

Firm Name.....

City.....*Zone*.....*State*.....

The New Dust and Fume Control System recently installed at Acme Sash and Door Co.

Reach For The Cause

The Battle Of Production Costs

The NEW economic battle is a skirmish between ENGINEERING, Production and COSTS. The swing is to AUTOMATION with high speeds and automatic feeding. Mr. Engineer, let us reach for the cause . . . remove DUST AND FUMES . . . which cut down the power of AUTOMATION.

Tooling and production ammunition must be guarded against the elements of dust, fumes and fire. Accumulative dusts prevents efficiency of every press stroke . . . increases production costs . . . creates physical hazards and is one of your GREATEST COSTS. Choose the system that fits the job — by Young & Bertke.

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The YOUNG & BERTKE Co.

DUST and FUME CONTROL • OVENS • SPRAY BOOTHS

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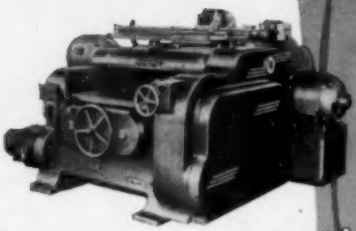
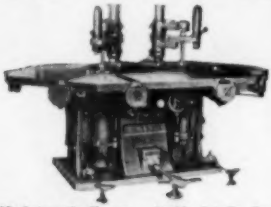
BLUEPRINT FOR LOWER COSTS, HIGHER PROFITS WITH WHITNEY WOODWORKING EQUIPMENT



97 Double Surfacer — For finest production planing. Direct Motor Drive. Feeds, 30 to 90 ft. per minute. Variable speed feed with Micro-feed Selector. Safety features. 30", 36", 40" and 44" widths.

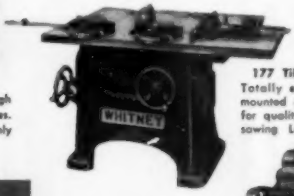


302 Automatic Shaper — Double Spindle. Four Slide feature. Motor driven belted spindles. There's a Whitney Shaper for every shaping need. Send us your requirements.

600 New-matic Facer — Eliminates waste in rough mill operation. Also for glued-up panels and cores. Rugged construction. Revolutionary design. A highly efficient machine. 24" and 36" widths.

From drafting board to finished assembly Whitney machines are designed for high quality, economical production, faster feeds, lower costs. For a more profitable performance day after day, year after year, Whitney is consistently the best buy.

In Whitney equipment you have the advantage of 117 years of experience in meeting and solving the woodworker's problems. We will be glad to work with you in helping to solve *your* problem. *Write, wire or phone today* for latest information and bulletins. BAXTER D. WHITNEY & SON, INC., Winchendon, Mass.



177 Tilting Arbor Variety Saw Totally enclosed, fan-cooled motor mounted on arbor. The precision saw for quality production and all-around sawing. Low maintenance.

Back Knife Lathe For low cost turnings up to 3" dia. 30" and 50" sizes. 3-speed V-Belt motor drive. Low installation and operational costs.

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FOR FINEST PERFORMANCE

117 YEARS OF EXPERIENCE AND KNOW-HOW

"Southern Church" Durability calls for WOOD-LOK

Skilled craftsmen use the finest materials to uphold Southern Church's* reputation for unsurpassed quality—and permanency! Each part is hand turned and carved from selected hardwoods—and then carefully assembled and adjusted with easily applied WOOD-LOK 3026, National's ready-for-use cold run resin glue.

*Southern Church Furniture Company
Manufacturers of Church and Institutional Furniture
Division of Southern Desk, Hickory, North Carolina

WOOD-LOK 3026 produces a handling	WOOD-LOK 3026		Core stock for

WOOD-LOK 3026 produces a handling bond in as little as 15 minutes. And often reaches machining strength in less than one hour.

WOOD-LOK 3026 provides a 5 to 7 minute open assembly and lining up period without fear of chilled joints or loss of strength.

WOOD-LOK 3026 simplifies the gluing of long grooves. It stays fluid in National's one-pint squeeze-applicator for fast, uniform spreading.

RESYNS®

National

ADHESIVES

SPECIAL OFFER! Write for 5 gallons of WOOD-LOK 3026 and a complimentary glue applicator—*on a trial and approval basis!*

NATIONAL ADHESIVES (Resin Division), Dept. WD, 270 Madison Ave., New York 16 • 3641 So. Washtenaw Ave., Chicago 32 • 735 Battery St., San Francisco 11

IT'S ECONOMICAL TO ADD

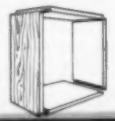
Thermatron

T. M. Reg. U. S. Pat. Off.

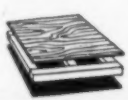
ELECTRONIC GENERATORS

to your present shop equipment

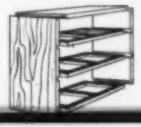
These wood bonding operations
are simple, fast and inexpensive
with Thermatron



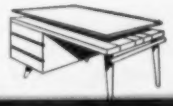
TV cabinet assembly.



Panel on frame doors, cabinets or furniture.



Case clamp assembly of dresser, book case or



Core stock for desk, chopping blocks, etc.

TV cabinet assembly.

Panel on frame doors, cabinets or furniture.

Case clamp assembly of dresser, book case or cabinet.

Core stock for desk, chopping blocks, etc.

HAVE YOU HESITATED to convert to speedy, efficient high frequency production bonding because of high cost of the special presses usually involved? Your existing clamps or equipment can be economically adapted for use with THERMATRON high frequency generators!

- Permanent bonds in seconds instead of hours.
- Save valuable floor space.
- Step up production.
- Amazingly low capital outlay.

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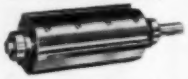
Chicago Sales: 2753 West North Avenue *Factories in Brooklyn, N.Y.*

You can DO so much MORE so much BETTER with this

Cutter-head guarded front and rear.

THESE *Atlas* DESIGN FEATURES GIVE YOU —

- BIGGER CAPACITY
- MAXIMUM ACCURACY
- SMOOTHER FINISH



Cutter-head spindle is machined from a solid bar of fine-grained steel, then precision ground — 2¾" in diameter. Weighs 10 lbs. Cutter slots are milled to extremely close tolerance for fine precision work.

Cutter-head can be quickly removed and the blade resharpened while right in the cutter head. This new feature is exclusive with ATLAS. Blade-height adjustment screws permit quick, accurate positioning of cutter head and blades.

Fence positions easily — one movement of lever releases or anchors it in place for width of cut adjustment. Fence tilts 45° both ways — has positive, adjustable stops for 45° positions. Index plunger for quick, vertical setting.

BIG *Atlas* 6" JOINTER-PLANER

Hard, soft, or plywood . . . with the improved ATLAS 6" jointer, you can be sure you'll get a *smooth, fast, accurate job every time!* That's because the ATLAS is *really* big and solid. The 32" x 4½" fence is bigger than most 6" jointer tables! And the table itself is 42" long. *That's real support!* ATLAS tables and fence are close tolerance ground to mirror-smooth finish . . . the table has *guaranteed alignment of .005" over-all.* Add ATLAS simultaneous blade height control, removable cutter head, and width of rabbet scale, and you see why ATLAS saves you time and money . . . why it's today's outstanding 6" jointer value. Send for literature.

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Quality Machine Tools Since 1911
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ATLAS METALWORKING MACHINE TOOLS
CLAUSING HEAVY DUTY MACHINE TOOLS

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New SKIL 1/4" DRILL

55% more powerful... yet lighter in weight!

MODEL 75

Big portable drill news! A *new* SKIL heavy-duty drill ... 55% more powerful, yet actually *lighter!*

Here's your short cut to reduced time and labor costs ... to increased production output! Unequalled performance ... top operating power, longer life. Capacity: ¼" in steel, ½" in wood. Choice of 7 speeds, 500 to 5000 r.p.m.... to meet your individual needs.

LOOK OVER THESE IMPORTANT FEATURES:

- All anti-friction bearings—for greater efficiency and low maintenance.
- Motor 55% more powerful, yet lighter than previous models.
- Contour-fit handle for easier, more comfortable handling.
- Larger inspection plates, easily removed for checking and cleaning.
- New molded rubber strain relief—protects cord against fraying or breakage at drill cord attachment joint.
- Handy, safety-designed trigger lock for continuous operation—side location for easy operation.
- Convenient chuck key holder on cord.

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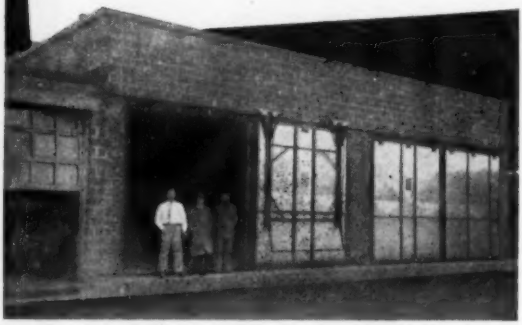
Very truly yours,

Carl H. Esdorn

Carl H. Esdorn, Owner



● *This is a photograph of the Standard Dry Kiln installation referred to by Mr. Esdorn. The two kilns are of the end piling, double-track type. They are 24 feet wide by 42 feet long, and have a control room and a boiler at the back end. Heated with an automatic oil-fired boiler, the kilns are used for the commercial drying of all kinds of wood grown in the Appalachian region.*

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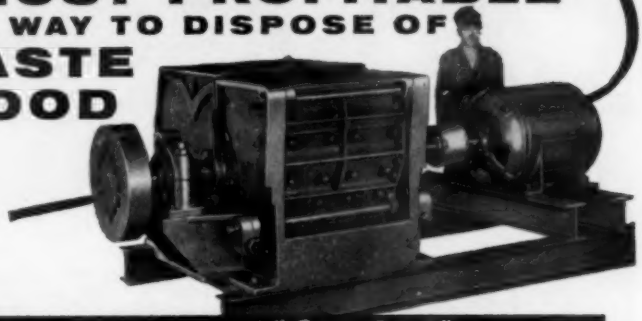

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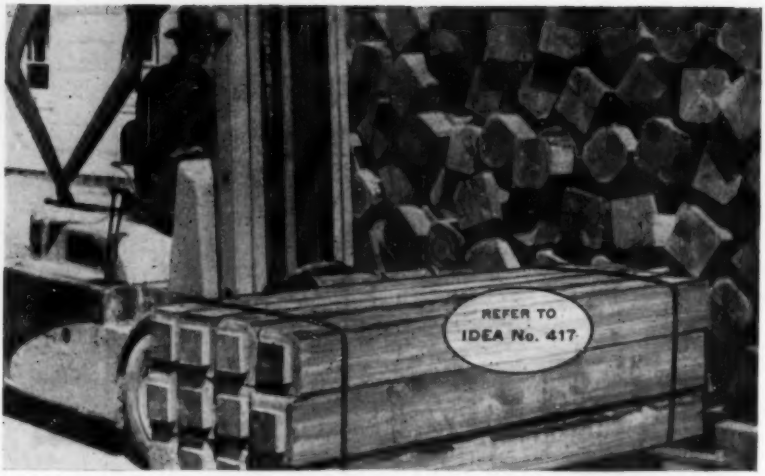

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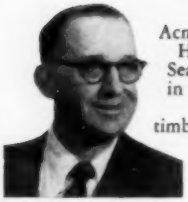

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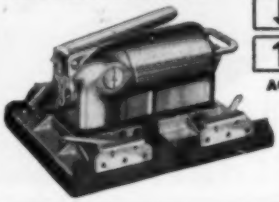

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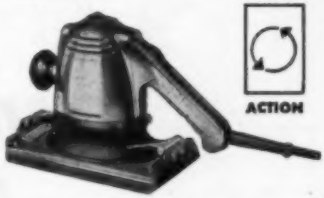

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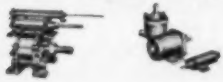

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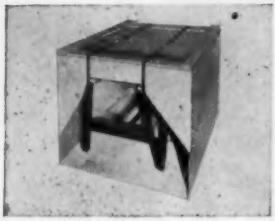

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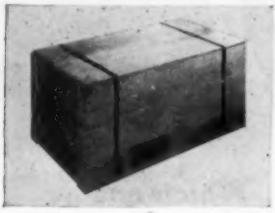

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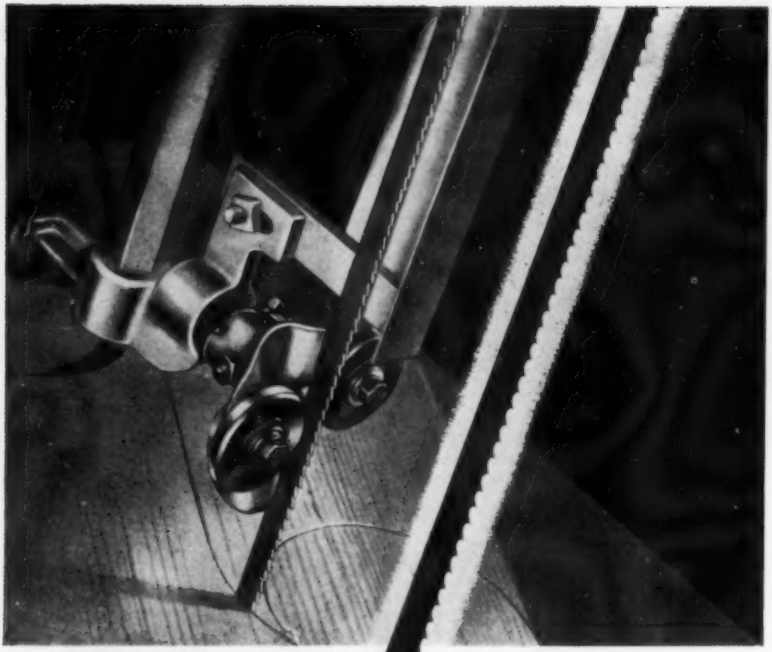

Two Types of SIMONDS Narrow-Band SAWS

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Both type blades are made in all standard widths, thicknesses and tooth sizes, in coils or welded-to-length. Now stocked by your Industrial Supply Distributor.

Need wise advice and service quick? Your Simonds Distributor can turn the trick

WOOD HAS A *Future!*

Ever since the Forest Products Research Society meeting last May, we have been waiting for the release of research information which the Weyerhaeuser Timber Company has had compiled by the Stanford Research Institute. Copies of this report are available this month.

Weyerhaeuser deserves our heartiest thanks for having vision and foresight to undertake a project of this sort. Midway through 1953 the Weyerhaeuser Timber Company asked the Stanford Research Institute to study and report on the probable demand for all forest products through 1975.

Space does not permit us to do more than emphasize some of the findings of the Stanford Research Institute. We have chosen to comment on these findings in this editorial because we believe this information, plus the know-how which the woodworking industry can use in examining them, should guarantee an excellent future for wood in the next twenty years or so.

The researchers tell us that bigger markets for wood lie ahead as a result of the expected growth in size and activity of the United States economy. This has been carefully worked out according to population, birth rate, etc. Every part of the forest products industry has met and will continue to meet competition from other materials. We can surely expect this in the next quarter of a century. Anticipating it and getting our eyes off of this year's profits only, will give us a better chance for bigger profits over the entire 20-year span.

Furniture and fixture shipments are expected to increase almost 100% in these years. Hardboard prices will tend to drop in relation to prices of competing materials.

Supply and utilization prospects indicate that the price of softwood plywood and veneer will probably rise in relation to the price of competing materials, but not as rapidly as hardwood products. In the hardwood plywood and hardwood face veneer industries, present costs are at such a level that imports of comparable quality can be sold for less than domestic production, and considerable markets have been lost to imports during the last few years.

Lumber consumed in floors dropped more than 50% from 1920 to 1953 due to inroads made by competitive materials: lumber's share now is 60% of the potential market. We believe that in this field we need to recognize the place of wood as a quality material and slant our promotion in that direction.

The future of wood is good, we believe, and this report gives facts and figures to indicate that it should be. Our industry must be ready for the market and we can be through the helpful information available to us. Improved merchandising, new techniques and more production through machine modernization are all part of the future that wood can have if we'll reach for it.

E. McDaniel
Editor

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Comments from THE NATION'S CAPITAL

By Arnold Kruckman
Washington Correspondent

The President recently announced that he will make a drive for a 15% cut in American tariffs to promote expansion of foreign trade. It will be recalled in his March 30, message he demanded Congress revise the Reciprocal Trade Agreement Act and extend it for three years; and he asked that the tariff be cut in trade with foreign countries at least 5% each of the three years. He would like the cut to be as deep as possible each year. In fact, it is no secret in Washington that he would prefer that the entire 15% cut be saddled on the domestic industry with one sweep. To make the President's intention perfectly clear, what he wants is that we shall give foreign industry the advantage of 15% more reduction on the tax or tariff they pay when they export—or import—their wares to the United States. This action, which the President calls liberalizing America's foreign trade policy, is to have the highest priority in the next session of Congress.

This plan is naturally of intense interest to the woodworking industry. It not only affects the hardwood plywood people, but other elements of the industry. The tariff cut begins with raw lumber and extends to some of the finest products of the woodworking industry.

It is of special interest that the Hardwood Plywood Institute acting through its Washington representative, Robert N. Hawes, attorney, has filed an application for an investigation of the Trade Agreements Extension Act of 1951, Section 7, as amended. In due time the U.S. Tariff Commission will hold its hearings, and make its recommendations to the President. It is probably reasonable to observe that its recommendations may not find favor in the White House. Over 60 such recommendations have been sent to the White House and only 3 have been considered favorably.

The most recent was the watch case. Among others the Waltham Watch Company found it could no longer do business and closed its factory because it could not meet the competition of the Swiss, even in low-price products. The pressure of this, and other allied instances in the watch business, which threw many thousands out of employment, and in other ways hit hard stockholders, and those who depend upon their income from the stock, brought about the favorable action.

The Hardwood Plywood Institute application brings out the fact, for instance, that the tariff concessions on hardwood plywood, to Finland, has dropped from 50% tax to 20%. Mr. Hawes stresses that the increase on imports from 1950 rose from 63,362,000 sq. ft. to 220,424,000 sq. ft. in 1953, an increase of 157,062,000 sq. ft., or 348%. He shows further that in the first half of 1953 there was an increase of 97,398,000 sq. ft., bringing the total up to 133,750,000 sq. ft., and in the first half of 1954 there was an increase of 34,979,000 sq. ft., or 37.5%. At the same time there was a steady decline in shipments by domestic producers from 453,010,000 sq. ft. in the first half of 1953 to 335,581,000 sq. ft. in the first half of 1954. This shows a loss in footage amounting to 117,429,000 sq. ft. in 1954 over the same period in 1953, or 26%. The application shows that the Bureau of Labor Statistics indicates the hardwood plywood index at 108.4 for 1953 and 101.9 for January-February, 1954, while the index for ALL commodities was 110.1 for 1953 and 110.8 for January, 1954.

No figures are readily available on profits of the industry. A fragmentary survey of a few companies indicates a downward trend from 1951. In 1950, profits on sales were approximately 12%, while in 1953 profits in sales were less than 5%; and, of course, there was a definite decline in sales.

The record clearly shows increase in imports in relation to shipments by the domestic producers. For instance, imports for the first quarter of 1953 totaled 36,947,000 sq. ft.; domestic shipments totaled 233,732,000 sq. ft. In the fourth quarter of 1953 imports had risen to 59,209,000 sq. ft., and domestic shipments had fallen to 172,270,000 sq. ft. In the second quarter of 1954 imports had risen to 81,183,000 sq. ft. and domestic shipments had fallen to 166,544,000 sq. ft.

Another interesting figure showed that in 1951 the ratio was 12 sq. ft. of domestic products to each square foot of imported plywood; but in the first half of 1954 the ratio was 2.5 sq. ft. of the domestic products to each square foot of imported plywood.

It is estimated that there are approximately 142 companies manufacturing hardwood plywood in this country. The 55 who belong to the Institute produce approximately 60% of the total domestic production. A survey of 43 plants revealed there was a reduction in work force of 19.3% in the first quarter of 1954 over the first quarter of 1953; and a reduction of 26.8% for the same period in hours worked. It was estimated wages lost in the same quarter amounted to approximately $2 million and that extension of the same rate of reduction in hours worked

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to the entire industry would indicate a loss of wages of from $5 million to $6 million.

For the first half of 1954, 52 member companies were located east of the Rockies. Of all the 142 companies producing hardwood plywood only 10 are located in the states of Washington, Oregon and California. The principal market hardwood producing states are Wisconsin, Michigan, Indiana, Tennessee, North Carolina, South Carolina, Georgia, Alabama, Mississippi, Washington and Oregon. Mr. Hawes reports the plants are principally small, and are privately-owned business concerns, except three or four which are public companies. All plants, with one or two exceptions, are located in small communities and are usually the principal industry in the community. The average number of employees is approximately 200, with some having as low as 100, and others as many as 400.

The application shows that since 1950 United States plywood imports come from the following countries: Japan, Canada, Finland, France, Italy, Surinam, French Equatorial Africa, Germany, Mexico, Panama, Netherlands, Sweden, Brazil, Taiwan, Spain, Israel, Palestine, Guatemala, Belgium, United Kingdom, Canal Zone, Austria, Nigeria, Philippines, Belgian Congo, Chile, Denmark, Cuba, Union of South Africa, Netherland Antilles, Switzerland, Norway, Yugoslavia, Australia and British Malaya. In 1953 Japan exported to us hardwood plywood to the value of $6,870,873; Canada, $7,618,155; Finland, $2,690,004; France, $620,316; Italy, $371,899; Surinam, $378,800; French Equatorial Africa, $293,351; Germany, $277,853; Mexico, $187,531; Panama, $241,648; Netherlands, $147,977. The rest all drop below $50,000 each, and smaller.

In the first half of 1954 hardwood plywood imports from Japan totaled $4,993,315; Canada, $3,857,417; Finland, $1,336-871; France, $147,531; Italy, $154,937; Surinam, $180,694; all others $785,074. It is interesting to find that the value per thousand square feet was $65 for Japan; $135.90 for Canada; $97.00 for Finland; $82.37 for France; $55.33 for Italy; $91.58 for Surinam, and $95.40 for all others. The big jump in imports of hardwood plywood occurred in 1953. There was 157% change in the imports of all countries; 506% in the imports from Japan; 583% in the imports from Finland; 1936% in the imports from France, and 19,650% in the imports from Italy.

The application states that 43 members of the Institute represent, by number, 30% of all companies producing market hardwood plywood and that they are geographically located: 5 in South Central States; 21 in Southern States; 17 in North Central States, and none on the West Coast. The report also states that veneer core hardwood plywood imports from Japan and Finland represent 57.4% and 10% of the total plywood imports in the first half of 1954. The hardwood plywood from these countries is, with the exception of Italy, the cheapest in price and lower in ad velorum duty value than all other countries exporting plywood to the United States.

Mr. Hawes concludes: "The reduction on the duty has resulted in an increase of imports and an unfair price on imported

"Our AMF De Walts are the handiest tools we've ever used!"

says Mr. E. F. Warner, Secretary and Works Manager, Trojan Boat Company, Kinzer, Pa.

De Walt with dado attachment performs the tongue and groove operation. Safety Power Feed runs at speeds up to 90 feet per minute.

"We process about 20,000 board feet of wood every week, while turning out an average of 60 motor boats and cabin cruisers.

"We've found our 3 De Walts work so fast they handle all the cross-cutting, mitering, beveling, bevel mitering, and straight and angle dadoing that we do. What's more, De Walt® makes each of these cuts easily, accurately and safely.

"There are no two ways about it. When it comes to building boats, our De Walts are the handiest tools in the business. We couldn't do without them."

You, too, will find amazingly versatile De Walt does just about every job — faster and better. Available in ½ hp to 10 hp models. Saw blades, 8" to 20".
See your dealer or write us, c/o Dept. WD-54-10 for details.

De Walt Inc. amf Lancaster, Pa.

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hardwood plywood which is much below the price required by the domestic producers in order to remain in business."

President C. D. Hudson of the National Wooden Box Association forecasts that the third quarter of 1954 will register some improvement in the volume of wooden box and shook production as compared with the first two quarters of the year; but he thinks the over-all average will be more than 10% under the third quarter of 1953, according to preliminary reports from various areas. He finds many individual manufacturers report improvement in demands during August. Manufacturers of beverage cases have had a fairly satisfactory volume throughout the summer. Ammunition box requirements have continued at the approximate level of the first two quarters of the year, which may be roughly estimated as one-third the volume of the Korean War period.

It is interesting to learn that firms operating east of the Rockies experienced a greater decline than those in the West. Reports from 61 manufacturers east of the Rockies show a drop of 26.67% under the previous year, while 79 manufacturers operating west of the Rockies registered an average decrease in volume of 10.96%.

The House approved the Anti-Government Competition bill, H. R. 9835, but the Senate failed to do anything. The bill was vigorously supported by a large number of business groups including several representing the woodworking industries.

The measure was designed "to provide for the termination to the maximum extent compatible with national security and the public interest of all commercial activities engaged in by the Federal Government in the United States which competes with private enterprise." It provided that the Secretary of Commerce, acting under regulations prescribed by the President, would have the responsibility of investigating Government business-type operations, and, where appropriate, suggesting termination or limitation of Government competition through the utilization of private facilities. Many thought that probably 90% of the members of the Senate would have voted for H. R. 9835 if given the opportunity. Enactment is believed to have failed chiefly through the effort of a few labor leaders and Senators who were able to delay consideration until the hour of adjournment. Also someone managed to introduce a joker which would have cancelled the intent of the entire bill. Those who gave outstanding support were Congressmen Clare Hoffman, Frank C. Osmers, Jr., Congresswoman Cecil M. Harder and Senators Joseph R. McCarthy, Robert Henderson and Margaret Chase Smith. The intent is to introduce a similar measure in the next session, the 84th Congress, and to prevent the rider of a joker.

Specifications for more than 1400 wood products, purchased by the Federal Government for military and other agencies, are listed in a 32 page directory assembled in cooperation with the U.S. Army Corps of Engineers. Practically every class of product used in Government is to be found in the book. It is called "Directory of U.S. Government Specifications for Wood Products" and lists, not only the products, but the agencies from which

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2 and 3 phase 1-100 horsepower

Type L Motor Saw Arbor

This popular unit is being widely used for cross-cutting, ripping or dadoing operations, modernizing belt-driven machines, etc. Built in three diameters, 3¼", 4", and 5⅛", center line to flatted top or either side, it is rated from 1 to 15 HP at 3600 RPM or higher ratings and speeds when operated from a frequency changer. Oversize ball bearings with arbors up to 2¼" diameter are mounted to eliminate end play, operation may be horizontal or vertical and either totally-enclosed dust proof or ventilated construction can be supplied.

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See other WOODS advertisment on pages 176-177

the specifications may be obtained. Copies are available, without charge, on request to Timber Engineering Company, 1319 Eighteenth Street, N. W., Washington 6, D.C.

Timber harvested from national forests ending with the fiscal year 1954 was an all-time record, 5,370,022,000 board feet. This is an increase of 4.7% over last year's record. The greatest increases were reported from the forests in Montana and Idaho where access roads have been built to salvage insect-infested timber. The value of the timber showed a drop of about $1.50 a thousand board feet, reflecting lower prices throughout the country. The total value of the harvest was $65,407,400 as compared with $70,616,025 in 1953.

The Federal Trade Commission charges 200 paint and wallpaper dealers in Metropolitan New York with combination and conspiracy in restraint of trade. The Brooklyn Paint and Wallpaper Dealers Association, Inc., its officers, board of governors and members numbering approximately 182 individuals, partnerships and corporations, are part of the proceedings.

Foreign Operations Administration has supplied funds to Denmark for the purchase of paints, varnishes and plastic coatings; to Indochina for the purchase of lumber and sawmill products; to Greece for 22,000 doors and windows; to India for equipment to set up a forest research institute; to Korea for three million board feet of lumber and for paint and various types of anti-corrosive and other paints to be used under water, and otherwise; to Spain for lumber and various wood products; to Kenya, Africa, for wood as building material, furniture and joinery, firewood, glue, sawmills and wood preservatives.

Commodities, equipment and services required for civil and and semi-military purposes in Europe, Asia and other scattered bits of the world, are listed in a Foreign Operations Administration Small Business Memo which gives the addresses of those missions which require catalogs and similar data. Write the Office of Small Business, Foreign Operations Administration, Washington 25, D.C., for a copy. There are needs in Turkey, the Philippines, Formosa, Greece, Israel, Korea, Pakistan, Spain, Yugoslavia, India, Bolivia, Lebanon, Jordan, Austria, France, Western Germany, Italy, Netherlands, Portugal, United Kingdom, Indochina, Indonesia, Thailand, Afghanistan, Burma, Iran, Iraq, Ethiopia, Liberia, Peru, Chile, Brazil, Venezuela, Denmark, Iceland, Norway, East Germany, French North Africa, Belgium Congo, British African Dependency, Portuguese Africa, New Zealand, Australia, Finland, Belgium, Colombia, Costa Rica, Cuba, Dominican Republic, Equador, Egypt, Eritrea, Haiti, Honduras, Guatemala, Libya, Mexico, Nepal, Nicaragua, Panama, Paraguay, El Salvador, Saudi Arabia, Uruguay, Cambodia, Laos, Vietnam, Kenya (Africa) and Ceylon. American firms are especially invited to send their catalogs, or brochures and export prices to: Mrs. Nodie K. Sohn, Director, Office of Procurement, Government of the Republic of Korea, 51-Chuksun Dong, Chongno, Ku, Seoul, Korea.

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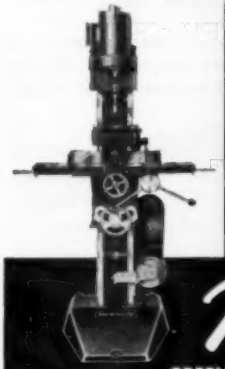
T-20 MORTISER



The machines shown here are but a few of those manufactured in our big new modern plant which turns out a full line of up-to-the-minute woodworking machinery. Our staff of design engineers constantly seek newer, finer techniques and quality controls. All moving parts — shafts, pulleys, heads are dynetrically balanced for smooth vibration-free service and long productive life. Full details of any Newman Machine is yours on request.

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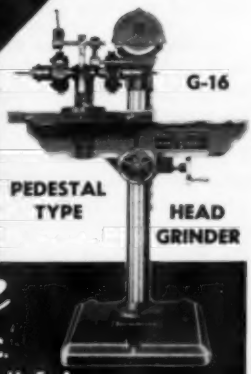

G-16 PEDESTAL TYPE HEAD GRINDER

Newman MACHINE CO., INC.

GREENSBORO, NORTH CAROLINA, U. S. A.

A research program for development of a process that will make finished hardwood veneer more resistant to burns, scratches, alcoholic liquids, and other deteriorating influences, may soon be underway.

'54 housing starts are running ahead of '53 volume. A late summer count showed 683,500 housing starts compared with 678,100 for 1953. Industry experts are now citing the possibility that homebuilding will reach 1.2 million before the year's end to make 1954 the second highest in history.

Southern California furniture makers are considering a mass buying plan under which a central agency would purchase certain raw materials and staple items in bulk quantities and redistribute them to producers. Supporters of the plan point out that considerable savings would be possible through reduced materials costs and, in many instances, lower freight rates.

During the summer Richard G. Kimbell was appointed vice-president of technical services for the National Lumber Manufacturers Association. Under his guidance the building code activities and constructive services of NLMA have gained nation-wide recognition.

Railroads use 30% of all lumber utilized in the United States. The WOOD WORKING DIGEST DIRECTORY, to be published very soon, traces the history of woodworking machines. It has been interesting to note in compiling this subject that the railroads have constantly influenced developments in the woodworking industry.

Sawdust for worms! This news item crossed our desk a few days ago. Hundreds of tons of sawdust are being composted regularly in the citrus areas of Florida. It is then used as a mulch and soil conditioner. Used with a commercial product, Fertosan, it makes excellent medium for breeding earthworms.

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DUO-FAST *Direct Drive* AIR TACKERS

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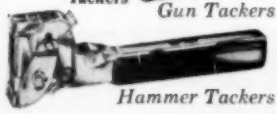

Hammer Tackers

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The Maritime Commission reports the first 120 new standardized, demountable wood gangways, or thwartship crossings, recently adopted for Liberty-type ships required only two days to assemble. Maritime Commission is calling for bids for private industry to supply the standard prefabricated wood gangways, to deliver at Mobile, Ala. and Beaumont, Tex.

National Motel Show is scheduled for November 1-3, 1954, Chicago. Some 80 firms are displaying at this show. The motel business is growing and uses many things supplied by the woodworking industry. If you are in the Chicago area you may wish to see this exhibit.

Word from an outstanding advertising official, Richard E. Deems, vice-president and general advertising manager of Hearst Magazines, Inc., says that confidence about the economic future of America is returning. He also said that the "recession" talked of earlier this year is over.

"Save your feet! Walk on wood!" This is advice from one of the nation's leading chiropodists and a new slant to give flooring manufacturers. The resilience of wood is one of the main reasons why wood is the most popular material for flooring in homes, stores, offices, factories, etc.

William S. Rosecrans, past president of the American Forestry Association, heads a commission to secure Federal aid in forestry, fish and wildlife restoration.

A new type of wood shipping and storage container for submarine periscopes has been developed and built at the laboratory of Timber Engineering Company. The box uses lumber and plywood, yet is stronger, lighter in weight than the traditional type of solid lumber container. Short lengths of lumber are laminated into longer ones, the box is enclosed with plywood and all component parts are preservatively treated.

Congratulations to Perkins! The Perkins Glue Company, Lansdale, Pa., is celebrating its fifty-fifth anniversary. Actual date was August 14.

Dodge Report of contract awards during August for future construction in the 37 states east of the Rockies broke several all-time high records. It was the highest August ever on record.

A costly lumber stain, as yet unidentified, brought together 19 representatives of the southern hardwood lumber industry. The stain has been recognized as apparently something new and different in just the past four years. Its occurrence has been reported in all geographical areas in which red oak grows.

The editor of WOOD WORKING DIGEST will be glad to hear from still more of you about helpful hints around the shop. We shall be publishing this column again in the November issue. Remember, we are paying regular contributor rates for all ideas accepted.

ONLY Porter-Cable ROUTER has this Amazing Kamgrip® Chuck

...Grips Bit Tighter, Keeps It Aligned, Prevents Shank Damage, and Assures Accurate Cuts

Porter-Cable's amazing *Kamgrip* Chuck has no threads. Instead three inclined cams on the collet wedge against three mating cams on the chuck. The rise of the cams is so gradual they exert tremendous pressure and holding power never before possible in router collets. Bits can't run out! Cuts are smoother! Chatter and kick are banished! Tool life is longer! Write today for free Router Manual, to:

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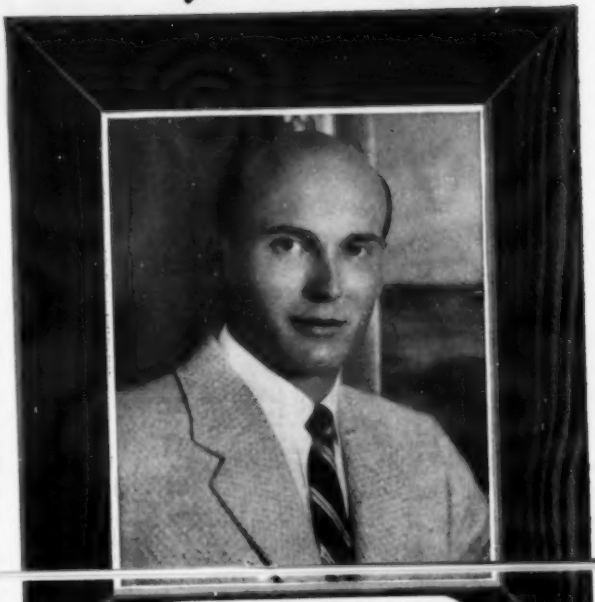
WHO'S WHO

among men who know glues*



FREDOLPH A. CERLING
McKeown Bros. Company

Designer and developer of welded laminated structural arches, beams, trusses and columns and the equipment to handle their tremendous proportions through manufacture, shipping and erection.

As McKEOWN'S chief development engineer, he designed the U.S. Navy's World War II drill halls and supervised production of their laminated members—vast 125 by 600 foot structures free of uprights that interfere with military formations—still serving colleges and universities for larger assemblies and major projects.

28-year pioneer in an industry that puts National Casein glues to the ultimate test for their capacity to stand stress, strain and drastic climatic conditions.

HOBBIES: Golf, and his family—a married son and daughter, plus five grandchildren, keep him thinking of new and better ways to a fuller, happier life.

CHARLES EDWARD KINDEL
Kindel Furniture Company

As Secretary and Assistant Production Manager of a firm that started building household furniture in 1878, "Ted" Kindel's major business interest is the improvement of furniture methods and techniques.

A graduate of the University of Michigan's Wood Technology Course, "Ted" (as he prefers to be known by all with whom he works) commenced his business career with an exploratory trip abroad, when he made a first-hand study of British furniture production techniques.

"Ted" is one of four Kindels active in the company today—and these represent three generations.

"Ted" took time out during World War II to train as a liaison pilot with the United States Air Force.

HOBBIES: Skiing and target shooting—in both of which "Ted" has won competitive honors. He is also a "wildcat" cartridge maker—with the satisfaction of having one of his designs used in the Wimbleton Cup Matches in 1953.

So you are unhappy because there are no new continents to discover—because interplanetary exploration is generations ahead of us? Instead—why not take a trip to your Glue Room, and discover a new and better way to do the laminating that plays an increasingly important part in today's wood technology . . . an improved method for glue application . . . or a new use for laminated wood products.

Purpose of our series on "Men Who Know Glues" *is to stimulate our own and your thinking on the subject of glues as well as to remind you that you'll stick with National Casein glues—because they stick for you.*

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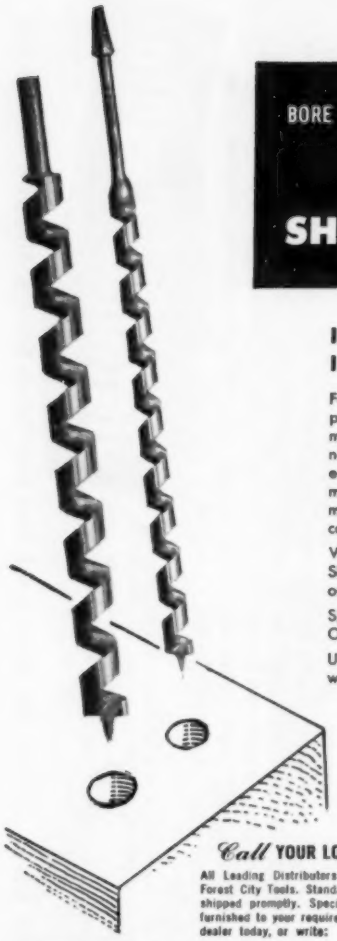

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YARD LAYOUT and Material Handling For LUMBER PLANTS

By Wallace Adams

Mr. Adams is a sales representative with the Moore Dry Kiln Company, Jacksonville, Florida.

WE have now reached the point where we can soon adopt the same claim for lumber that the Nabisco people make for their shredded wheat biscuits—"Untouched by human hands."

I am not trying to tell you that sanitary lumber makes better furniture or flooring, but I am trying to point out that each set of finger-prints on a board represents a cost of $2.50 to $3.00 per thousand board feet. Eliminating the finger prints obviously means greatly reduced operating costs, hence greater profits for the producer of lumber and savings for the consumer.

With recent increases in minimum wages, plants in the east are becoming more conscious of their rising costs for stacking and handling lumber, and are taking a vital interest in automatic or semi-automatic stacking and unstacking equipment.

No two plants have exactly the same handling problems, so we of the Moore Dry Kiln Company had to keep the design and construction of our equipment flexible in order to meet a wide variety of conditions.

Many are familiar with the use of a cable lift for letting a full kiln car of lumber down into a pit so that the top layer of lumber can be fed easily into a planer or to a cutoff saw. Moore cable lifts have been used for this purpose for many years.

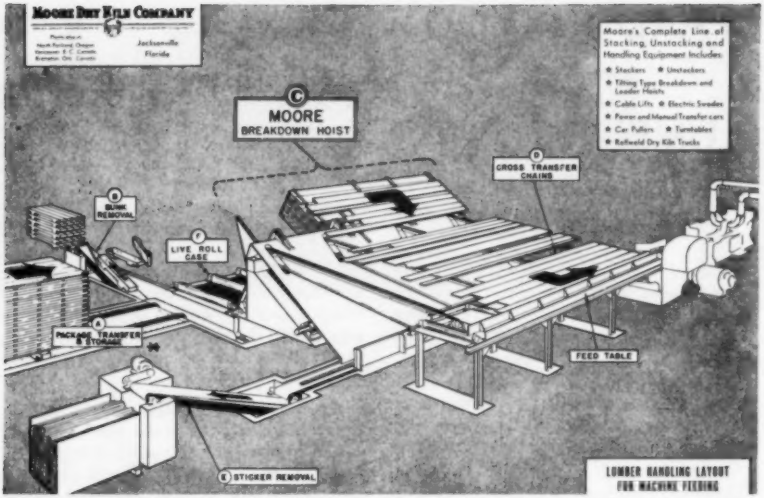
For small plants wishing to speed up stacking of kiln cars without making any considerable investment, we use the same cable lift equipped with retractable sticker guides so that two men can stack the lumber on kiln trucks, always working at convenient waist level.

As each course of lumber is laid in place, the lift goes down the thickness of the lumber plus the sticker thickness, and the men place the next layer of stickers in the guides. When the load is completed, they move the sticker guides away from the sides of the loads, and the cable lift brings the finished load up out of the pit and it rolls off toward the kilns.

Our records show that an average two-man crew, manually stacking kiln loads 8' wide by 16' long by 11' high, would normally stack approximately 10,000 board feet per 8 hour day. With the cable lift stacker just described, the same two-man crew would stack 20,000 board feet per day—thus the cost of stacking is cut in half by the lift stacker.

Incidentally, this simple lift stacker is very useful at the end of a green sorting chain where only a small percentage of the boards are pulled off the chain and most of the boards can go to the end of the chain to be stacked on the lift stacker.

Another development in lumber handling systems is the tilting-type breakdown hoist. Either a unit package or a kiln car of lumber is placed on the hoist, which tilts to an angle and carries



Lumber handling layout for machine feeding, showing complete breakdown hoist outfit handling stickered packages, endwise movement.

the lumber up the tilted columns. As the top course of lumber passes the top of the columns, the boards slide down by gravity onto a conveyor.

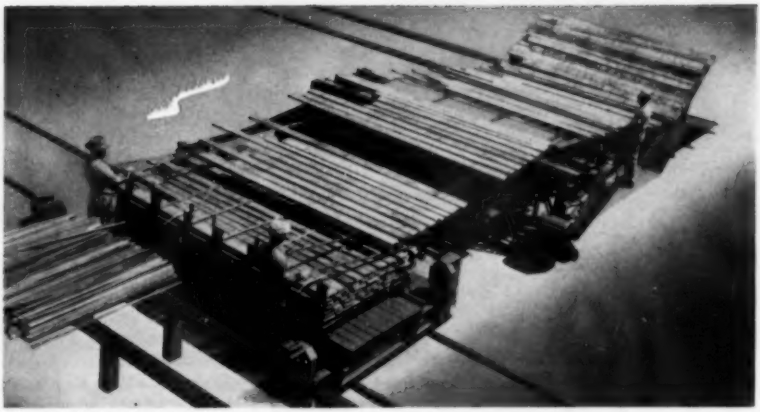
The most frequent use for the breakdown hoists is to feed lumber to a planer or to a cutoff saw. For this application, we equip the hoist with a sticker slide and a sticker removal belt located underneath the conveyor chains. Thus, as the boards slide onto the conveyor, the stickers continue to slide down onto the sticker removal belt which conveys the stickers to a rack.

Since the columns of the breakdown hoist are all on one side of the platform, lumber can be brought onto the hoist either endwise or sidewise. The particular application will determine which direction is best. Lumber can be fed to the breakdown hoist by kiln trucks on track rail, or packages of lumber can be brought to it by floor chains, gravity rolls, powered live rolls, or by any combination of these methods. A belt for removing bunks can be added if desired.

One important consideration in laying out a breakdown hoist installation is to provide ample temporary storage for lumber entering the hoist so that the fork lift truck or straddle truck or power transfer car can bring a supply of lumber to the hoist and can then go away to do other work without having to be back at the hoist each time a load is put onto the tilting breakdown hoist.

Some modern installations of Moore breakdown hoist unstackers in the east include the Library Bureau of Remington-Rand, Inc., Herkimer, N.Y., where stickered kiln loads are fed to a cutoff saw. The Catskill Craftsmen, Inc., Stamford, N.Y., feeds stickered packages of kiln dried lumber to a cutoff saw, and Howland Bros., Berkshire, N.Y., are finishing a similar installation.

Having developed the breakdown hoist and the cable lift stacker, we were well on the way toward having our first



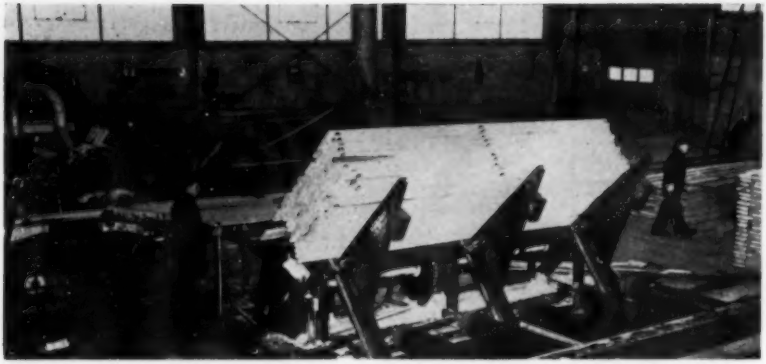
Moore chain-arm stacker.

automatic lumber stacker which would take a bulk-piled package of green lumber as it came from the green chain of the sawmill, and place this lumber in measured sheets onto a cable lift to build a stickered kiln load.

What we needed in between the breakdown hoist and the cable lift was the conveyor mechanism which would receive the four foot wide sheets of boards coming from the bulk-piled package on the hoist, and which would accumulate these boards into sheets eight feet wide and place them directly onto the cable lift. Out of these developments came the Moore roller-type stacker and the new Moore chain-arm stacker.

For the Moore roller-type stacker, we let the breakdown hoist slide its boards onto one section of chains. These chains are running constantly while the stacker is in operation. Whenever the operator wants to stop the flow of boards, these raise up and lift the boards slightly off of the moving chains. We call these arms our friction stop. Beyond the ends of these friction stop arms, we put a course divider stop. By filling the chains with boards between

Pusher type stacker at Lester Piano Mfg. Co., Lester, Pa. Note conveyor belt bringing lumber from box car to chains. Height of box car is adjustable to height of lumber in car.



Moore breakdown hoist system (rear view) shown feeding matcher—including hoist live roll and package transfer chain outfits, also special floor chains with jump skids for transferring packages from machines to storage or to box cars for shipping.

the ends of the friction stop arms and the course divider arms, the operator measures out a sheet of boards eight feet wide.

If he desires, he can easily make sure that the outside boards on each course are long boards so as to stack a neater pile of lumber. This set of chains is also equipped with an "even-ender" so that the boards are all pushed slightly endwise, making all boards even at one end.

When the eight foot wide sheet of boards has been measured out, the boards then go onto a second set of conveyor chains. This second conveyor operates intermittently, and is under the control of the men placing sticks on the lift. For maximum stacking speed, two men are used to place the nine stickers.

When they are ready for a course of boards on the cable lift, they push a button which starts the second conveyor, which pushes the entire eight foot wide sheet of boards out onto the cable lift, sliding them right over the stickers. A level control lowers the lift

Lift unstacker at Hood Lumber Co., Hermanville, Miss. One man with pushbar unstacks as much as 50,000 feet per eight hours.

Cable lumber lift, feeding dual cutoff saws at Drexel Furniture Co., Drexel, N.C. Note compact layout for lumber flow through plant.

platform automatically, and stops the lift at exactly the right level for the next course of boards.

These roller stackers do a beautiful job of stacking square edge lumber, and we have adapted them in various tonnage capacities for stacking all sizes of unit packages as well as full kiln loads.

Next came the problem of stacking bark-edge or round-edge lumber. Quite a few gang saws have been sold in this country, which rip a log or cant into a large number of boards with one pass of the log through the saw. Because the roller stacker mechanism actually pushes the boards onto the cable lift, pressure is built up between the edges of the boards. This slows down stacking of bark-edged lumber. When you try to push bark-edged boards against each other, they tend to ride up over each other.

To handle this problem, we developed our new chain-arm stacker. There is a chain on top of the arms and this chain is so operated that as the arms retract to drop the boards onto the lift, the arms simply draw this roller chain out from under the boards and there is no dragging action tending to pull the boards against each other. Thus, absolutely no pressure is built up between the boards, so bark-edged boards simply fall into place without any trouble.

It soon developed that in designing this chain-arm stacker to handle bark-edged lumber, we had at the same time solved several other problems.

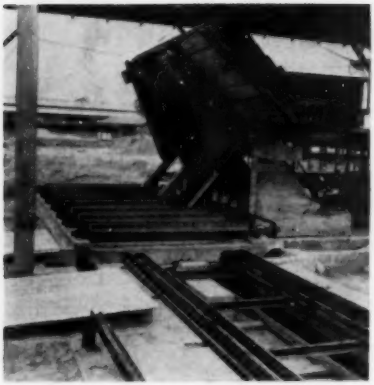
By changing the speed of the conveyor chains feeding the chain-arm stacker, we could automatically leave a space between the boards. There are a large number of cross-piled cross-circulation kilns which require a space between boards for the circulation to get through the load. Also, if you want to stack packages of lumber six feet or eight feet wide that are going to be air-dried in the yard, it is best to space the boards for better air drying.

We had only to equip the chain-arm stacker with a clutch arrangement and the operator could stack his lumber either tight edge-to-edge or spaced as he desired. The unique chain-arm design, eliminating "drag-back," creates a very uniform spacing of lumber in the packages.

Also, because the chain-arm stacker actually carries the new course of boards out over the lift and drops them

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

This material was originally presented in the 37th Short Course in Kiln Drying sponsored by the State University of New York, College of Forestry, Syracuse, N. Y., April, 1954.



Breakdown hoist shown feeding solid package to Moore roller type package stacker at Argent Lumber Co., Hardeeville, S.C. Note conveyor chains in foreground which handle solid packages brought in by fork or straddle truck.

in place, this stacker can be used nicely for stacking bulk-piled packages. Thus, we now have an automatic stacker and unstacker combined, which is especially useful for many smaller plants.

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Another valuable feature of the chain-arm stacker is that the arms operate on a time cycle. The men placing the stickers know that those arms are going to bring another course of boards in just a few seconds, so it is up to them to get the stickers in place. Thus, the machine works the men, instead of the men working the machine, and there is not so much time wasted by the men taking another drag on a cigarette, or waiting to tell a joke or to watch a pretty girl walk by. I don't mean to say that when operating a chain-arm stacker, the men can't enjoy life, but they soon learn to do it while their hands are placing stickers.

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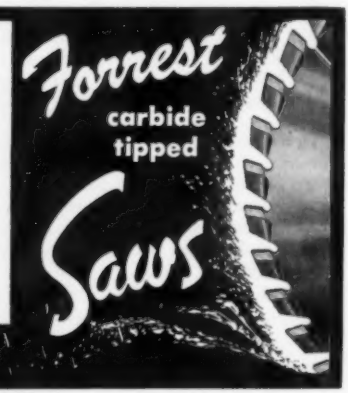

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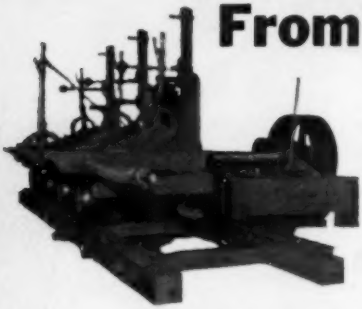

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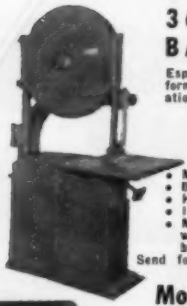

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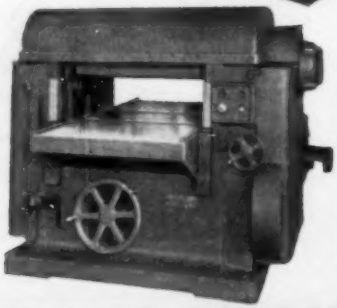

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COLUMBIANA, OHIO

"The Carbide Problem"

By Arthur R. Segal

The author, Arthur R. Segal, a graduate of the College of Engineering (mechanical), Bachelor of Science degree, University of Illinois, worked with carbide in its applications to cutting tools as a research and development engineer in the metalworking field, prior to World War II. Mr. Segal founded North American Products Corp., Edwardsville, Ill., a company devoted exclusively to the manufacture of carbide tools, and throughout World War II, designed and produced solid carbide type and tipped milling cutters and saws for the machining of metals.

The company's wide experience with the carbides and tool design developed in the metal cutting field was significant in the design and construction of the "Woodsman" line of carbide saws and tools in the woodworking, plastic, and graphic arts industries, and resulted in the granting of a number of patents on blade designs applicable to those industries.

CARBIDE cutting tools have stepped up production in the woodworking field in many instances more than 1500%; machined materials in the metalworking field, previously considered unmachinable; eliminated operations in the plastic field that resulted in great cost reductions; and produced finishes on materials and accuracy in machining operations that revised standards in the graphic arts field.

Such phenomenal performance would seem to command immediate acceptance of carbide cutting tools. This conversion to carbide tools has occurred in the metalworking field, but a mixed feeling —ranging from intense interest through the "doubt-it-but-try-it," to the "we-want-no-part-of-it" attitude—exists in the woodworking field. Why should this be so? What happened?

Gaining Confidence

Reflection of the introduction and development of carbide in the metalworking field in comparison with the same experience in the woodworking field may explain in part this restrained attitude to carbide tools. Comparisons with conditions in metalworking are made only as a means of presenting an actual measure of potentiality and, though conditions may differ between these two fields in the early stages of carbide use, there is no reason for the woodworking field to lag behind them any longer.

If the "air is cleared" by discovering the points of doubt that affect the users'

attitude toward carbide, confidence will turn the key to unlock the remarkable results mentioned earlier for every wood and plastic fabricator.

There were three differences in introducing carbides to the woodworking industry, as compared with introducing it to the metalworking industry where it is commonly used today. First, much of the development of carbide tools took place in the metalworking field during the war period when greater emphasis was placed on such developments and business was better able to afford promotional ventures.

Problems in Acceptance

On the other hand, carbide saws—the first major introduction of carbide tools to the woodworking industry—took place in the postwar period. Second, carbide manufacturers and machine tool manufacturers were jointly experimenting with carbide tools during its inception in the metalworking field. The consumer bore very little, if any, of the financial burden of tool design development, and the machine tool manufacturer, while observing the advantages of carbide for cutting tools, also obtained a clearer concept of machine design changes that would provide the maximum results with these tools. In comparison, the introduction of carbide to the woodworking industry was carried on not as an experimental program and not as a product promotion by the carbide companies, but as a business venture by carbide tool manufacturers. This difference in conditions placed the acceptance of carbide cutting tools on a very precarious pedestal. The carbide tool manufacturers, naturally, assumed from the successes of carbide tool applications in the metalworking field that they could apply fully developed tools for fabricating wood and plastic. The woodworking field, confronted with hard-to-cut wartime developments of plastic and other new materials plus the effect of inflation on production costs plus glowing accounts of carbide tool accomplishments, naturally, saw an easy solution to their problems in these new tools.

Perhaps, nothing good comes easy, but thin carbide saws at 3600 r.p.m. were not like thick-bodied milling cutters for metal at 300 r.p.m., router bits at 12,000 r.p.m. were not like end mills at 1000 r.p.m., and lathe tools were not like shaper tools. The woodworking steel-tool manufacturers were not too familiar with carbide. The carbide manufacturers were not too familiar with woodworking. The woodworker was not familiar with carbide, its maintenance, nor did he have the facilities for maintenance. The souvenirs hanging on the walls of both the carbide tool manufacturers and the woodworking companies attest to the unintended experimental program that took place under conditions anything but conducive to a proper attitude toward carbide tools.

Where were the carbide manufacturers? After years of great losses in the development of carbide, they were confined mainly to the metalworking field, consolidating their process for their future extension in other fields. Where were the woodworking machine-tool manufacturers? The conditions of the development of carbide woodworking tools, through competitive tool manufacturers, left them no place to enter the development. Their observations, made from the sidelines, are beginning to appear in machine design changes which will be more accentuated in the future.

The brief reflections made indicate the natural reaction of woodworking and plastic fabricators to some unpleasant financial burdens of this experimental era. The less capable carbide tool manufacturers dropped by the wayside. Those remaining bore a financial burden far greater than the consumer and have developed designs

and methods of manufacture and understanding of application that guarantee top performance of carbide tools today. The leaders in the cabinet shops, job shops, furniture factories, mills, and lumber yards, etc., have written off the failures of the early days of carbide tools and are reaping every benefit that these modern tools have to offer. Others who have deep scars of admittedly bad experiences are justifiably cautious and often adamant to carbide tools. This latter group is becoming cognizant of the increasingly good reports from carbide applications in the past months. Eventually, they will call in carbide for another trial. Undoubtedly, they will be amazed at the progress made and will become the greatest advocates of these tools once their confidence is restored. This change of attitude is in the not-too-distant future and with the solution to the problems posed in point three following, carbide will take its permanent place in the woodworking industry equal to its use in any other field.

Carbide Education Needed

The third point effecting the position of carbide cutting tools in the woodworking field is the greatly neglected education of the many hundreds of service shops in the maintenance technique of carbide tools. Most of the metalworking shops, being equipped to grind high-speed steel tools, easily converted to the grinding of carbide tools, since it required no large scale change in their equipment. This factor, plus the gradual change to carbide during the experimental development period, plus the joint interest of the diamond wheel manufacturers to also solve carbide grinding problems, resulted in proper maintenance education of metal-cutting carbide tools. A moment's reflection will reveal the significance of easy access to proper maintenance of tools. Without this solution to tool maintenance, carbide, in the metalworking

"Well, you're always calling it chicken feed."

field, would never have attained the use it has today. Yet, in the woodworking field, there is no simple conversion from steel to carbide tool maintenance. Many of the larger companies have saw filers, most companies depend on outside service shops; neither can handle carbide, yet, both have tried. Initially, carbide tool manufacturers tried to discourage return of tools to them for sharpening, mainly because they disliked competing with service shops who often were their dealers and, secondly, because of their desire to concentrate on new tool manufacturing problems. Without realizing it, the tool manufacturers in their lack of foresight in education of tool maintenance, created a very injurious attitude toward usage of carbide by their customers. Even though tool manufacturers reversed their actions and today press as hard for the resharpening business as for new tool sales, the conditions are not correct for the woodworker who happens to be some distance away from such facilities.

Maintenance Problems

Of great importance is the opinion of the many hundreds of service shops around the country, whose existence is based on serving the tool maintenance needs of the wood and plastic fabricators. These two have become very

dependent on each other and have had a close cooperative relationship for many years. It is not only a nuisance for the customer to send carbide tools to the factory instead of to the local service shop, it is also discouraging to the service shop to be unable to serve all of his customers' needs. It is, indeed, wrong to replace steel tools with carbide and take away both from the service shops. Even if a service shop did consider installation of carbide grinding equipment, the thought of competing against every tool manufacturer presents a question as to the volume of business attainable being worth the investment. In several cases tool manufacturers have seen service shops learn a little about carbide and then begin making carbide tools. The volume of business lost to the tool manufacturers was insignificant but, in many cases, these tools were not made right and hurt carbide sales indirectly. It is easy to see how a few cases, such as this, caused tool manufacturers to be reluctant to assist any outside concern in the technique of proper tool maintenance. Add to this the reluctance of tool manufacturers to help competition, and the results are a vicious circle with the consumer locked in the middle. The solution is evident and in the coming months efforts toward the education and promotion of tool maintenance will be seen, and in a short time the users of carbide tools will have a new confidence, a security in using carbide tipped cutting tools that will stabilize their phenomenal performance into commonplace standards.

One more note of comparison should be made. The high-speed tool manufacturers in the metalworking industry were also early producers of carbide tools. Wartime demand and similarity of equipment for production made such conversion a great deal more logical. Unfortunately, some time elapsed until carbide woodworking tool successes indicated consideration by the regular woodworking steel-tool manufacturers. The manufacturing process was somewhat foreign to steel-tool production and with justified doubt concerning universal acceptance of carbide, these companies were reserved in their approach to these new tools. With their activities added to those of the carbide tool manufacturers, stabilization of carbide tools, through distribution of proper application and maintenance information, will be accomplished more easily and quickly.

Advancement of Carbides

Today, as compared to a year ago, carbide tools are far advanced to standards of performance. Better technique in bonding is pulling carbide tip losses, a great retarding factor in use of carbide saws, down to less than one-half of one per cent. In this phase of complaint by all carbide saw consumers, it is well to point out that the carbide saw manufacturers have an almost critically small bonding surface, as compared to other tools. There is also no fool-proof means of checking the bond strength of carbide saw tips by a mechanical means that will be short of destruction of the tip. Cracks in the steel body can be found by use of several methods. Cracks in carbide can be found by the Ziglo and other processes. There is not a carbide tool manufacturer who hasn't "sweat bullets" over this problem, knowing it has been of great concern to the user of these tools. Perhaps, methods will be developed for 100% bonding of tips, but one factor that should be recognized by the user, until such methods are developed, is that loss of one, two, or three tips in a saw blade, provided the tips lost are in alternate sections and not following each other, does not affect the operation of the blade.

Almost all manufacturers replace lost tips without charge, basing such failure

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in incorrect bond of the tip. Such blades should continue to be operated until dull and not returned for service until then. The natural thought of the user is to protect his investment by immediate rejection. One certainly cannot criticize such a stand, unless there is a thorough understanding concerning responsibility. Once that is clearly established, the user can enjoy the benefits of the tool as the manufacturer intended and a better, cleaner relationship will exist. The ability of the consumer to rely on full production from a saw blade having several teeth missing is accountable to the accurate alignment of the teeth, because of use of machine grinding methods, as compared with hand-filing and hand-setting of steel blades.

This may seem insignificant, but it is the secret of maximum cutting efficiency in all tools. The effect of removing a tooth is to double the load on the following tooth. Due to the inaccuracies in hand-set steel saws, such a condition of unequal tooth loading is the rule, rather than the exception and is given little, if any, thought by saw users. Perhaps, only a few steel saw operators realize the truth of this, but it is because they have never quite considered the similarity between a tooth missing the cut and a tooth being out completely. It is true that a missing tip produces unbalance, but the resulting centrifugal force differential is far less than would exceed any injurious yield of the spindle or bearing, even on light machines.

Are Carbides Needed?

The woodworker has managed for many years without giving too serious a consideration to cutting tools. Unlike the metal industry, where the cutting tool and the machine are paramount in the final shaping of metals, the wood craftsmen have had that skill

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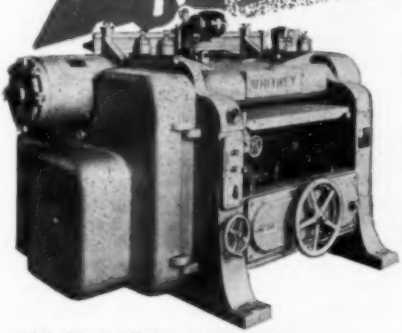

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in their hands. This secondary position of woodworking tools eliminated the needed incentive for tool development, and made prices more of a consideration with quality being assumed. There are and have been excellent steel, woodworking tools. Yet, there are some very skilled craftsmen who today could not tell the exact difference between a good and a bad steel tool. Many would be amazed at what would seem fantastic performance of a steel saw blade that was made extremely accurate. Yet, such blades could be commonplace, providing price was not the sole consideration and proper means of maintenance was available.

Today, the woodworker has the advantage of accuracy plus carbide, the hardest, wear-resistant metal known, handed to him in every carbide tool. The hardness of carbide demands accuracy of machining and it cannot very well be divorced for price reasons. It is true corners can be cut, but in general the carbide tools required for the harder-to-cut, new materials have created a conjecture in the minds of woodworkers quite different from the old, passive attitude about tools and machines. Yes, there is a change in thinking in the woodworking industry and they are going to force the change on every element connected with the industry. Consideration of tooling going on today, will be only part of the adjustment.

Strange as it may seem, carbide tools have to a certain degree been responsible for creation of their own problems. In the case of saw blades, the primary purpose of this hard material was to give greater wear resistance and, therefore, longer life between grinds. This accomplishment has become secondary to the exceptionally smooth cutting derived from the accurate tooth alignment, enabling rip and cross-cut blades to cut as smoothly as good, steel

planer blades. In many instances, carbide blades have been rejected for less than the new-considered standard of smooth cutting. Thus, carbide has imposed upon itself a narrow margin of manufacturing tolerance, seldom demanded in the woodworking field. This factor requires that quality must be a paramount consideration of all carbide tool manufacturers.

Router Bits

Carbide tools have made possible the development and use of better, but more abrasive, glues. The ability of carbide to stand up on abrasive and hard-to-cut materials has not been an entire solution to the problems of router bits. Steel router bits generally give a warning of dullness by resistance to feed that occurs far below the breaking pressure of the tool. Carbide dulls in a very gradual and imperceptible manner, resulting in feed pressures unknowingly being imposed that cause tool breaking. There is, of course, no economy in either cheap or expensive tool destruction. Add this to the tendency to operate carbide longer, because of lack of means to touch up the cutting edges and a very unnecessary, but untenable, problem arises. Recognition and action on tool maintenance requirements will eliminate much of this very injurious attitude toward carbide.

Lack of consideration and, perhaps, misunderstanding of power machines also, have made a more complex problem. The greater the radial hook of the bit, the less the cutting pressure. Thus, the tool feeds easier and the horsepower consumption is decreased. On the other hand, the cutting edge of the tool is weaker, because the included angle of the tip must be smaller to provide proper clearance. Such design is essential when small horsepower machines are used, and fair results can be obtained on easy-to-cut materials. The

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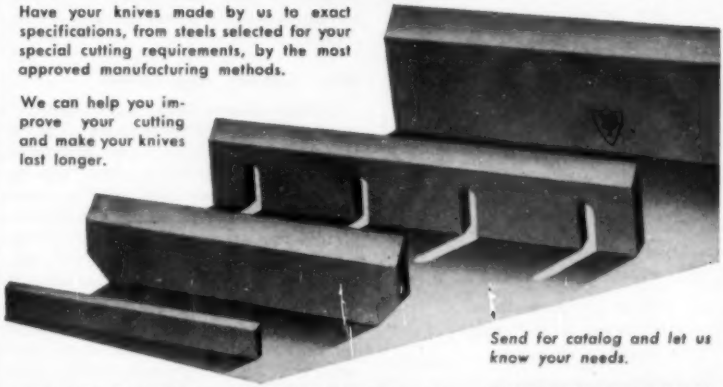

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larger, radial hook of the tool will help keep up machine speed—a very important and often neglected factor in proper router bit performance. The carbide router bit manufacturer is limited to the amount of radial hook that can be incorporated in the tool by the necessity of providing proper steel backing to support the tip. He is also confronted with the necessity of standardization of design that must be as suitable for the routing of plastic tops as for plywoods, hardboards, or pine.

Consideration of machine size and maintenance of sharp cutting edges will be brought about in the near future through a greater distribution of informative facts. These facts will also provide a clearer conception of the inability of carbide to bend, resulting in increased care when shallow cuts are made and how breakage occurs through bending at the shank juncture aggrevated by dull tool operation. Yes, router bit manufacturers have developed through concentrated research on these problems, better steels, better designs and with better understanding of maintenance of tools, carbide router bit performance will be a standard in the industry.

Other Carbide Applications

Carbide shaper saws, solid head cutters, and shaper knives short of better maintenance practice, are presenting fewer problems than any other tool applications. Undoubtedly, variable speeds would be an asset to obtain maximum results from the wide variation in materials cut on these machines and, perhaps, future designs will incorporate suitable speed ranges.

Many applications of carbide knives for molder and sticker operations have been overwhelmingly successful; others have presented problems, but consideration must be given to the fact that the heads were made for high-speed steel and a change in cutting angles that

would have been better for carbide cutting performance was not possible.

Carbide cutting tools in the woodworking industry have opened new markets and created a new and beneficial interest in the mechanical phase of the industry. There is no infallible material or process and though great gains have been made in carbide tool applications, design, and understanding, there has been a tendency to "stick heads in the sand" regarding admission of over-all problems. By willing cooperation between consumer and tool maker, between tool maker and tool service shops, between carbide manufacturer and all these companies; by putting carbide cutting problems and their solutions up for all to see, rather than hiding them as insignificant deviations from normal performance, by complete education so that familiarity takes the place of doubt, carbide tools will be accepted, demanded, and the truth of carbide claims will be verified in better products and better standards.

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Evolution of LUMBER DRYING TECHNIQUES and DRY KILNS

Part 11

By Paul H. Graham

IN VIEW of the current keen interest in the development of kilns designed for high temperature drying it would appear that a separate discussion of superheated steam kilns is justified to cover high temperature drying developments currently popular in Europe, especially in Germany, and which are under research investigation, chiefly in Canada and England.

A commercial kiln of this type is presently being produced in Canada, which is advertised as being developed and designed to suit the requirements of the Canadian lumber industry. The product of an American kiln manufacturer might also be considered to be of comparable design since the high temperature drying principle is employed in the main, with high circulation rates being provided and method of operation quite similar in many respects to that of the German high temperature kilns. Another American concern has developed a kiln of this type for quick drying of cement blocks and is currently experimenting with its possible application for lumber drying.

A description of the early American superheated steam kiln was given in the first article of this series. Of all the kilns developed of this type, those kilns operating with reversible circulation characteristic of the superheated steam kiln patented by H. D. Tiemann in 1908 produced the best results. The fastest drying in commercial kilns used on the West Coast were those which achieved relatively high circulation by means of ejectors.

Operating with high temperatures (as high as 230 degrees F.) in an atmosphere of steam while maintaining a relatively moderate vapor pressure gradient, these kilns dried lumber much faster than the medium- and low-temperature conventional kilns. It is reported that 4/4 green softwoods were dried to about 10% moisture content in as little as 24 hours. Although this fast drying was very favorable, the substantial increase in steam consumption used by these kilns, the rapid deterioration of kiln buildings, and the degrading effect of high temperature drying on some species of lumber eventually caused this type of kiln to fall into disrepute to such an extent that its use in the United States was finally abandoned.

The theory of drying lumber by high temperature in an atmosphere of steam, however, has generally been considered to be sound drying procedure, when properly applied, and to be well suited for drying certain kinds of lumber. Its final rejection for commercial kiln drying was more the result of practical eco-

nomics rather than a failure of the basic drying process to function properly.

Reports of this drying method point out that when proper circulation is provided, only the dry-bulb temperature needs to be controlled and the superheat used both as a heating and drying agent. Since there is no air present in most applications, conventional relative humidity relationship does not apply.

Commenting on this, an American kiln drying authority stated, "The relationship among wet- and dry-bulb temperatures, relative humidity and E.M.C. can be determined regardless of the presence or absence of air."

As to high temperature kiln operating requirements, H. D. Tiemann explains in "The Kiln Drying of Lumber":

"The drying capacity of superheated steam at atmospheric pressure is proportional to the number of degrees of superheat above 212 degrees F. and to the quantity of steam circulated. By maintaining a sufficiently high velocity of the steam passing through the piles of lumber, it is therefore possible to carry a comparatively low degree of superheat without reducing the drying rate. This is why it was possible to use as low a temperature as 225 degrees F., which means a high humidity of 77% whereas the old "Aweco" kiln patented in 1908 used 300 degrees, giving a relative humidity of only 22.7%.

"So long as there is plenty of free-water in the wood, the lumber itself does not become heated above 212 degrees F.; but as soon as the free-water has boiled off, its temperature will begin to rise until ultimately it reaches the temperature of the steam, and the surface dries to an E.M.C. corresponding to the humidity."

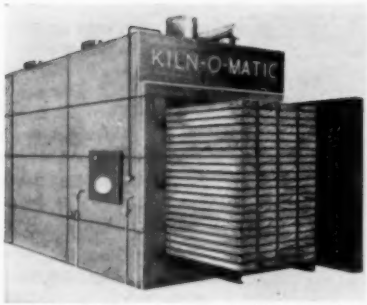
After stressing the importance of reversible circulation in the kiln for uniform drying with superheated steam, Tiemann comments on relative humidity relationship:

"As in low temperature drying, the relative humidity in relation to the E.M.C. of the surface of the wood is significant in the case of superheated steam to avoid too severe casehardening. When drying at atmospheric pressure, the air becomes entirely displaced with sufficient steam present, at 212 degrees F.; for the vapor pressure is then 30" mercury. At 225 degrees F. saturate steam has a pressure of 39". The relative humidity of steam at atmospheric pressure heated to 225 degrees is therefore 30/39 or 77%, whereas at 300 degrees the pressure when saturated is 136", and the humidity at atmospheric pressure is 30/136 or 22.7%. Hence the advantage of keeping superheat temperature as low as possible when drying green wood."

He concludes: "There is also this important consideration when drying in steam in the absence of air; namely, there is no danger of any portion of the lumber being exposed to a lower humidity than that of the steam, since as the steam cools in contact with the lumber, its humidity must increase, becoming saturated at 212 degrees F. Thus, there is only one temperature to control—that of the entering steam."

Consideration of the theoretical aspects of drying wood at high temperatures (above 212 degrees F.) by German scientists, particularly at the University of Stuttgart, was underway as early as 1940. As stated by H. O. Fleischer, technologist at the Forest Products Laboratory, in his "Drying Rates of Thin Sections of Wood at High Temperatures" (Yale School of Forestry Bulletin No. 59):

"In Germany recent developments in drying wood in superheated steam have stimulated consideration of the theoretical aspects of drying wood at temp-



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Kiln-O-Matic Canadian High-Temperature Lumber Dryer fabricated of aluminum sheeting, air and vapor-tight welded.

eratures above 212 degrees F. Recognizing the importance of heat transfer at these high temperatures, Kiefer used a relationship similar to that which Sherwood applied to drying at lower temperatures to a constant rate period. Kiefer's formula equates the rate of heat transfer to the rate of vaporization from the drying surface. In setting up this relationship, Kiefer assumes that the surface temperature of the drying specimen rapidly comes to a wet-bulb temperature of 212 degrees F. and remains there during the greatest part of the drying cycle. If this situation actually prevails, then steady-state heat transfer conditions may exist, and the calculation either of heat transfer or of moisture diffusion, following conventional formulae, may be valid."

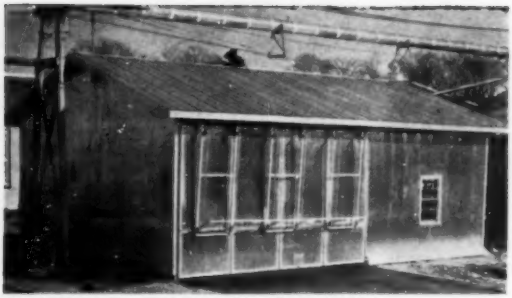
Interest in the superheated steam kiln and possibilities of high-temperature drying was revived in Germany immediately following World War II and the Germans are currently leading the field in the design and use of the superheated-steam kiln. Robert Hildebrand and Otto Kiefer have designed good kiln structures to overcome some of the failures characteristic of early American kilns this type.

The Germans have improved their original design and construction. Their earlier kilns were of heavy sheet iron construction but the latest models are constructed of thinner metal, said to be about 99% aluminum, sheet construction; are made vapor tight with welded construction; are well insulated to keep them dry, and have a high thermal insulation against heat losses.

Air intakes and vents are provided to exhaust moisture and a high rate of circulation is provided by fans of the high-pressure blower type. Heat may be supplied in the form of either steam or electricity. Some kiln installations provide both boiler and electric elements to permit switching to electric power during periods when the boiler is not being fired, as at night and over weekends.

Some of these kilns are provided with automatic control, but generally the kilns are controlled with just a simple thermostat. Everything else connected with the kiln operation is manual. In the automatic control type of kiln clock-actuated mechanisms are used to govern supply of superheated steam, to stop heating, and to switch off the kiln operation when the drying cycle is

Lumber Dryalator—fully packaged lumber dehydrator.



Maine kiln dries millwork stock with two Lumber Dryalator units.

Courtesy: Lumber Dryalator, Inc., Boston, Mass.

completed. This is strictly a time-temperature function without the air of moisture control characteristic of conventional dry kiln operating at lower temperatures.

The German high temperature kilns are relatively small, with normal capacity of about 2,000 to 6,000 feet. They are frequently installed within major plant buildings. The kiln unit may be shipped from the manufacturing plant as a complete prefabricated unit, or it may be disassembled for export shipment. These kilns are said to have the advantage of mobility permitting them to be installed in any building or yard or to be moved if necessary without too much difficulty.

Very low steam consumption is claimed for these kilns generally, requirements as low as 75 pounds per square inch of dry steam pressure being claimed to produce satisfactory kiln operation. The range of operating temperatures possible to attain are said to run as high as 265 degrees F., but best results seem to have been obtained with a drying temperature of about 230 degrees F. Wet-bulb temperature may be carried at 212 degrees F., but is usually run somewhat lower.

Special air circulation systems are used where drying tolerances are close, as in high-quality drying, with adequate capacity claimed to achieve an end moisture content of plus or minus 1%.

A contention has been made that these kilns should be properly classified as "high temperature kilns" rather than "superheated-steam kilns", in that their operation involves the use of air-steam mixtures, and control of the drying process is obtained by means of wet- and dry-bulb temperature controllers just as in the conventional dry kiln operating with lower temperatures. No provision has been made in these kilns, however, for automatic and continuous control of humidity as that afforded by automatic wet- and dry-bulb recorder-controller systems used in conventional dry kilns.

The heating system may comprise of heating coils (usually of fin-pipe type), or may consist of two banks of electric heating elements located in separate ducts on the discharge side of the fans. The heaters are controlled by a common thermostat. A copper-constant and thermocouple installed about midway down the kiln wall on the intake side of the pile serves to activate the thermostat and can be pre-set for the temperature desired.

The number of fans installed for circulation vary with size of the kiln. They are vertically mounted centrifugal fans and provide circulation in the kiln

ranging generally from 300 to 400 f.p.m. These fans bring dry outside air into the kiln through a common duct and exhaust moist air through a single vent. Some control of humidity as drying progresses is effected by varying the intake of fresh outside air by means of the air-intake damper adjustment.

A communication received from a leading American kiln drying authority who was asked to comment on high-temperature kilns developed by Hildebrand and Kiefer states:

"They do not seem to be using the superheated-steam principle even though the equipment is designed for it. It seems to be general practice to first air-dry both softwoods and hardwoods and then put the lumber in these kilns to wallop the hygroscopic moisture out with a very dry-bulb temperature and no relative humidity control.

"No one knows too much about strength-reduction effects due to these high temperature drying conditions. It is interesting that conditioning to relieve stresses does not seem to be necessary. It is thought that the high temperature causes something like plastic flow to partially relieve casehardening. Permitting the lumber to stand around on sticks for a time after drying also results in some surface moisture regain, which could also be effective in stress relief.

"The Hildebrand and Kiefer kilns do, however, with their mechanical circulation, metal walls, tight doors and good insulation overcome some of the disadvantages experienced earlier with superheated kilns."

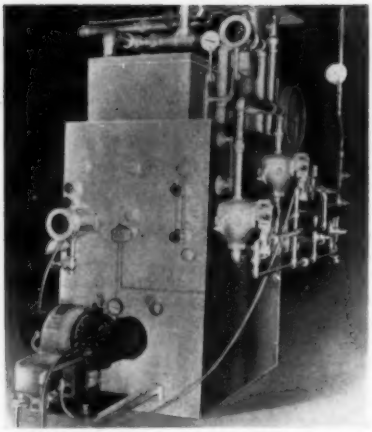
Since about 1950 there have been many claims emanating chiefly from Europe that these high-temperature kilns have dried lumber satisfactorily in hours rather than days formerly required by conventional kiln drying. Following closely along the lines of experience with the development of forest photogrammetry techniques, in which Canada borrowed the pattern from Germany and adapted and improved the techniques for application to Canadian timber, a few Canadian manufacturers were influenced to import these new kilns.

Taking advantage of this trend, Hildebrand accompanied one of his kilns to Canada. This kiln was first delivered to a plant in Montreal, where the first North American tests were made by expert company technicians, before the kiln was shipped on to its purchaser in Toronto.

Besides various papers published on the economics and techniques of high-temperature drying, reports have also been issued from some of the German high-temperature kiln installations, such as six kilns installed by the German Federal Railway; an installation at a sawmill of the Norwegian Railway System, as well as results of trials of this new drying technique by wood institutes in Finland and Sweden.

In 1952 the Forest Products Laboratories of Canada, Department of Northern Affairs and National Resources, instituted a project to provide research information on high-temperature drying. A high-temperature pilot kiln was obtained on loan from the German manufacturer and has been used in tests at the Ottawa Laboratory since September, 1952. These series of tests have been carried on primarily for the purpose of evaluating the high-temperature drying process rather than for determining the efficiency of the kiln itself.

Results of these tests to date have been reported in published form by J. D. Ladell, of the Ottawa Laboratory, in a report devoted mainly to softwoods —"High-Temperature Kiln-Drying of Canadian Woods" (Mimeograph 0-170).



Consolidated Duo Boiler — automatic steam generating unit produces superheated steam under low pressure.

Since parts of the detailed high-temperature kiln description contained in this report have already been fairly well covered at the Forest Products Research Society meeting at Grand Rapids in May, 1954, only the substance of the report relating to prccedure and conclusions is presented to afford a basis of individual evaluation.

The pilot kiln used in the tests was constructed of sheet steel, lined internally with aluminum, and was well insulated. It was heated electrically, with thermostatic control that could be set to any temperature between 175 and 265 degrees F. Limited control of humidity as drying proceeded was effected by varying fresh air intake into the kiln by adjustment of the air-intake flap valve. Low-pressure steam (less than 10 p.s.i.) was used for humidification, required only while the lumber was being prepared for drying—during the warming-up period.

Relative humidity was maintained at a high level during this period, when air intake and exhaust vents were kept shut and fans were kept running, and the kiln charge absorbed moisture. At the start of the drying period, steam was shut off and vents were opened, and relative humidity fell rapidly. The thermostat was set to maintain a constant-dry-bulb temperature that was decided upon for drying. When the desired moisture content level was reached in drying, the heaters were switched off.

Automatic equipment provided with the kiln to automatically open intake and exhaust vents when the kiln reaches the desired drying temperature and to shut the kiln off either at a predetermined time, or after relative humidity falls to a pre-set level, were not used during these test runs.

The purpose of the warming-up period was to bring kiln temperature up to drying temperature without permitting drying to take place. No steam was added to the kiln after the warming-up period was completed. After the drying cycle was completed, the charge was permitted to cool. In some cases cooling was followed by a conditioning treatment.

A 20% sampling was made of the total charge for moisture content before and after drying, but no sample boards were used during the drying process. To simplify calculations required, the kiln was mounted upon platform scales and the charge weight was recorded when the kiln operation began. Progressive readings were then made to determine the rate of drying.

Defect samplings were made before and after drying. Electric power consumption was measured at the main supply line. Moisture content (weight readings) measurement was taken at half-hour intervals. Temperature and humidity readings were made at regular half-hourly and hourly intervals. Other observation—air intake, thermostat

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operation, variation in kiln temperature conditions, etc.—were also made with similar regularity.

Tests were made of 4/4 eastern white pine, 4/4 and 8/4 eastern white spruce, 4/4 and 8/4 western hemlock, Douglas fir and western cedar in two series of tests made up of a total of 13 runs. All lumber was box-piled on a conventional kiln truck with 7/16" stickers considered more suitable for the kiln's high circulation rate (between 300 and 400 f.p.m.).

Drying temperatures for eastern white pine and eastern white spruce ranged from 228 to 232 degrees F. (plus or minus 2 degrees) in completed runs. Warming-up periods ranged from 2 hours, 54 minutes to 3 hours, 32 minutes. Drying times varied from 11 hours 39 minutes to 25 hours 16 minutes. Cooling time was about 4 hours. Total time ranged from 19 hours to 42 hours, 10 minutes. Average drying rate varied from 2.5% to 3.5% moisture content per hour.

Test schedules for the western species showed average drying temperature range from 234 to 237 degrees F.; warming-up periods of 1 hour, 44 minutes to 4 hours, 3 minutes; drying times of 17 hours, 31 minutes to 45 hours, 59 minutes; cooling times of 4 hours, 10 minutes to 6 hours, 5 minutes; total times of 28 hours, 10 minutes to 55 hours, 9 minutes; average drying rate of 0.8% to 2.8% moisture content per hour.

The initial average moisture content for eastern softwoods dried ranged from 39.4 to 113.2%, and this was brought down to a final average moisture content range of 4.4% to 9.8% in completed runs. Two runs of these species were not completed because of mechanical breakdown. Western species dried

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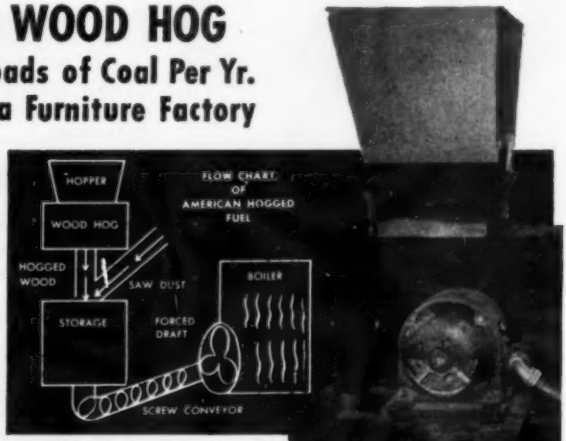

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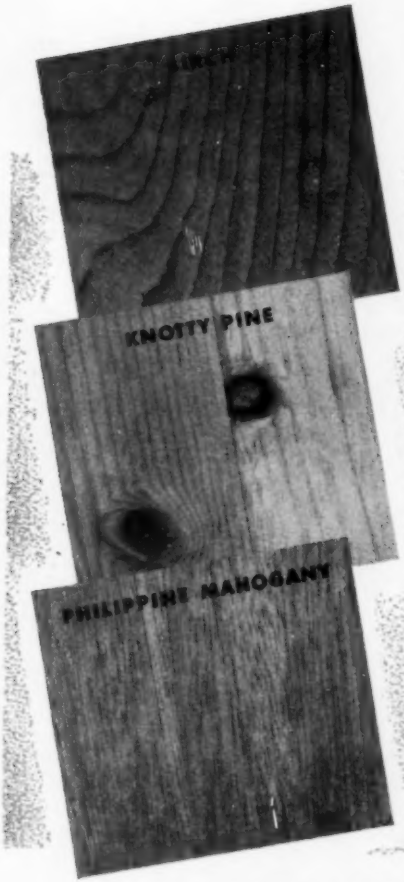

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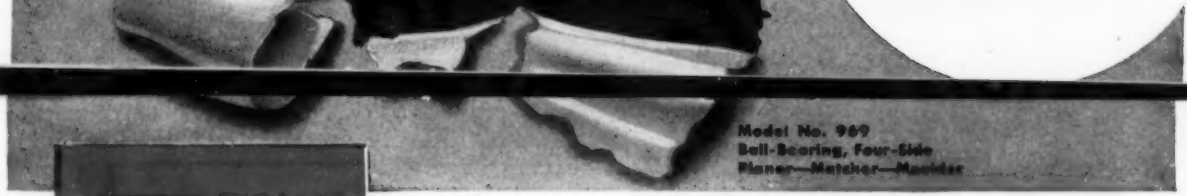

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showed an average initial moisture content range of 36.1% to 75.2% and a final moisture content range of 5.2% to 12.5%. Drying temperatures for these species were held at about 230 degrees F. until the fiber saturation point was reached, and then were increased to about 250 degrees F. for the final drying.

Drying was rapid, with drying time from three to six times faster than that obtained with conventional kilns which dry at temperatures below 212 degrees F. While average quality was good, moisture content throughout the charge and within individual boards was non-uniform. Casehardening was uniformly severe. Conditioning treatments showed fairly satisfactory results in relieving stresses in all but one run where they were applied and helped to uniform moisture content variations although not within generally acceptable limits.

Discoloration was slight and little checking, bowing, cupping or crook resulted. Knots remained firm, though hemlock and Douglas fir showed some splitting of tight knots. Machining properties were generally satisfactory. The most extreme moisture content variation occured in eastern white pine and western red cedar.

It was indicated that a drying temperature of about 230 degrees F. would produce best results but maintaining this desired temperature proved difficult due to unavoidable fluctuations. Electric power consumption for the various kiln runs per thousand feet varied from 350 to 1.062 kilowatt hours, but it is pointed out in the report that economical drying was not a prime objective. Consumption of pounds of steam per pound of water evaporated (calculated equivalent to electrical energy consumed) varied from 1.55 to 2.65. Steam consumption for the warming-up period and actual pressures used were not measured.

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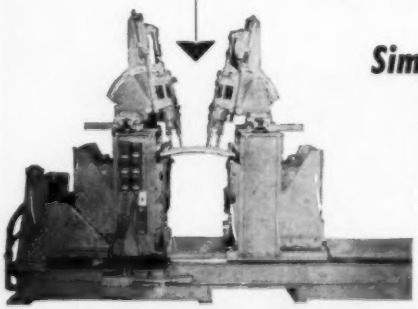

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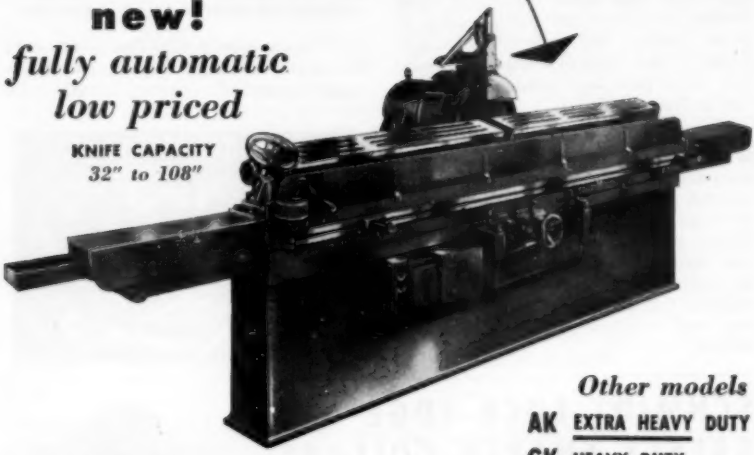

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Tests made for strength properties were not considered sufficient for conclusions to be drawn. Tests for static bending and toughness were made on a small number of samples from each kiln run and matched air-dry samples. No clear results were obtained in toughness tests but static bending tests showed no effect on the strength of white spruce and western hemlock, about 5% reduction in western red cedar and white pine, and about 10% reduction in Douglas fir.

It was concluded that it was advisable to try to determine cause and means of reducing the wide range of moisture content in drying which showed up in all tests before attempting to develop drying schedules, providing, of course, that other factors prove favorable for industrial application. Study of different relative humidity levels indicated that too low a relative humidity inhibits drying.

A generalization is also made "that lumber can be dried at these low humidities (as low as 5%) without severe structural damage would appear to indicate that at high temperatures the relationships between relative humidity, drying rate, and moisture content are modified by factors as yet unknown."

It would appear that live steam over 75 p.s.i. is required for efficient high-temperature kiln operation. Also, by

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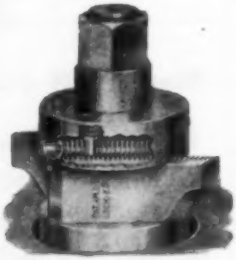

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comparison based on size, the initial cost of the high-temperature kiln would be much higher than a conventional dry kiln of the same size. On the other hand, the high-temperature kiln might possibly produce up to four times as much dried lumber in the same drying period as the conventional kiln.

Considering the suggestion made that electricity would be more economical than steam in some locations, steam would also seem to be required both for the warming-up period and for conditioning. Superheated steam would not be required, however, and low pressure steam could be furnished by a small electrical steam generator.

In a general conclusion this report states: "It would seem that high-temperature kiln-drying would be most suitable for the medium-to-small wood-working plants, where fluctuating requirements mean that small loads must be dried with as little delay as possible. From this point of view, one or two small high-temperature kilns might prove an economical adjunct to existing seasoning facilities.

This pre-supposes that this process will prove effective for the drying of hardwoods, green from the saw, which from present knowledge is by no means certain. Europe has shown that serious difficulties may be encountered in this application of the process, and, while Ottawa Laboratory exploratory tests in this regard gave fairly satisfactory results, they were not as promising as were the tests with various species of softwoods."

(To be continued.)

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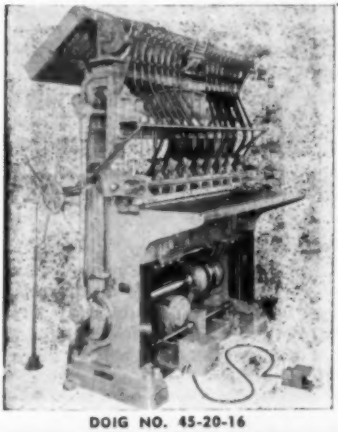

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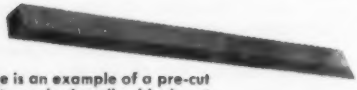
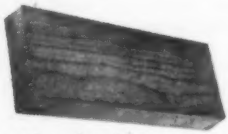
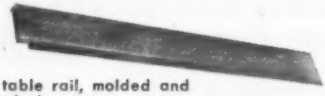


Here is an example of a pre-cut part—a shade roller blank, cut to length, with rough face.



This swing seat is surfaced on two sides and edges are ripped.

This Weyerhaeuser wood part is closer to its final form, having been molded lengthwise.



Card table rail, molded and end-worked.

This piece of luggage stock is edge-glued pine, surfaced on two sides—also typical of the partially fabricated Weyerhaeuser wood parts.

Wood parts by Weyerhaeuser—available pre-cut or partially fabricated—are increasing profits for a wide variety of manufacturers. They offer these basic advantages:

1. Reduction of waste—each wood part is cut to size. No trims, no edgings, no disposal problems.

2. Savings in shipping—freight is paid only on wood actually used.

3. Savings in equipment—machines such as saws, molders and tenoners may be eliminated.

4. Reduction in floor space—bundled wood parts conserve storage space—no cutting area required.

5. Speed up assembly—pre-cut wood parts move directly from storage or car to assembly line—can be palletized at car door to further reduce handling cost.

6. Savings in manpower—almost all workers are on direct assembly.

7. Reduced inventory—Weyerhaeuser "On Time" shipments allow manufacturers to schedule stock shipments only as needed.

We will gladly supply further information and, if desired, an analysis of your wood parts operations, showing how Weyerhaeuser can help you cut costs and increase your production. Call or write our Chicago office.

Weyerhaeuser Sales Company

Industrial Wood Parts Department

ROOM 2114 • 400 WEST MADISON • CHICAGO, ILLINOIS

Can DIMENSION STOCK *Save You* MONEY?

By J. L. Kennedy

EVERY corporation, regardless of its size, must be alert to trim costs in order that it may stay competitive. In the field of dimension stock (pre-cut wood parts) considerable research and development has been made over the past 25 years which have resulted in considerable progress, thus assuring a dependable source of supply for properly kiln dried lumber, either in a rough dimension form, semi, or completely machined to exact specifications of the ultimate user.

Types of Dimension

Kiln dried hardwood dimension lumber is defined as hardwoods "which have been processed to a point where the maximum waste is left at the dimension mill, and the maximum utility delivered to the user. It is manufactured from rough boards of flitches of varying thicknesses to the specific requirements of a particular plant or industry. It is in specified thicknesses, widths, and lengths, or multiples thereof."

There are three principal categories of hardwood dimension:

(1) Rough dimension stock which consists of blanks sawed and ripped to specific size.

(2) Semi-machined dimension which is carried one or more steps in manufacturing processes. It may include one or more of several operations such as edge or face gluing, surfacing, molding, tenoning, drum-sanding, equalizing, trimming, mitering, etc., but which will not make the product a completely fabricated one ready for assembly.

(3) Completely fabricated dimension represents parts pre-cut and completely machined with no additional machining to be done by the user.

The importance of purchased dimension should be emphasized. There is the question of efficiency of operation and the economics of the utilization of purchased dimension.

Purchased dimension is economically sound for the following reasons:

(a) Savings in transportation costs;

(b) Control of inventory and definite lumber costs;

(c) Less investment in equipment;

(d) Reduced overhead;

(e) Problems of waste simplified.

Cost Savings in Transportation

The purchase of rough lumber carries with it not only the cost of the material itself, but also the freight charges paid on the lumber in its original form. It also includes moisture and defects (or waste). When you consider these freight charges in buying raw material, it becomes evident that any reduction in transportation costs would represent a substantial saving to the consumer. Wood parts purchased kiln dried are cut to exact lengths and widths, with the waste and the water left at the dimension mill. Consider,

Mortising operation on dimension stock.

for example, the average weight of air dried 4/4 oak, which is 4200 lbs. per 1000 feet. Compare transportation charges on this weight to the kiln dried rough dimension of 2730 lbs. and to machined dimension (approx. ¾" finished thickness) of 2048 lbs. per 1000 feet.

Control of Inventory and Definite Lumber Costs

Most of the wood-using industries find it necessary to carry a substantial inventory of rough lumber, perhaps a quantity of different species for as much as three or four months consumption. The consumer who purchases his wood parts would find it advantageous to deal with a reliable dimension producer and acquire pre-cut items, in order that he may carry with safety a much smaller inventory. Inventorying dimension stock eliminates the hazards involved in rough lumber, such as the result of degrading through checking, splitting, warping and staining. Purchased wood parts are practically 100% usable. Purchased dimension results in quick turnover, thus increasing working capital and reducing interest and other charges.

An important factor in purchased dimension is the known raw material cost. Today's competition makes it essential for the fabricator to accurately determine his costs. A reliable dimension mill specializes in cutting dimension and through concentration of raw material and large investment in storage buildings and dry kilns, provides the wood user with the best quality that money can buy.

Less Investment in Equipment

The purchase of kiln dried wood parts permits the consumer to operate his factory with a minimum investment in machinery and equipment. This is especially important where the user is faced with the problem of congestion in his factory. The release of space for storage and assembly provides increased turnover of working capital and increases in sales and profits.

Reduced Overhead

The use of purchased dimension will reduce overhead without a reduction in total volume of sales. Reduction in whole, or in part, of raw material inventory will cut cost of inspection, supervision, maintenance and other indirect yarding and kiln drying expenses. Dimensioning machinery may be reduced. In any event, the reduction will result in less supervision, less indirect

Dimension stock ready for loading.

Final inspection.

mill costs and reduced insurance, depreciation and taxes. Administrative expenses will also be reduced, depending on the extent of the cut-back in both raw material inventory and machinery and equipment. Department heads and clerks previously devoting effort to the details of inventory and machine operations can be freed of their responsibilities. Officers, sales executives and research technicians can devote more time to the improvement of designs of finished products, to marketing and to improved efficiency in finishing and assembly of finished products.

Problems of Waste Simplified

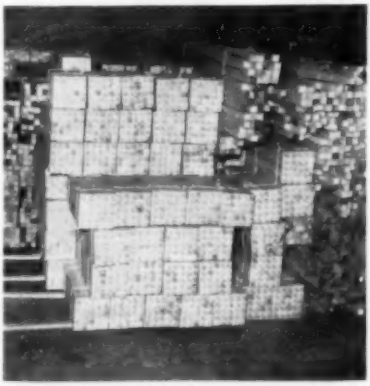
Properly manufactured wood parts result in a very minimum of waste to the consumer. It is of utmost importance that the true lumber costs, above all other cost elements, be accurately predetermined in the preparation of cost estimates. This factor may represent from three to ten times the dollar value of other cost factors making up the total cost of production of a given item. Well established dimension producers know the importance of the selection of the proper lumber grade and accurate forecast of utility in processing of wood parts. To the fabricator, known lumber costs are provided when he purchases pre-cut items. He is relieved of all of the problems relating to raw material, storage and fabrication.

The dimension plants today, through considerable research and experimentation, have evolved facilities for production of an unbelievable range of wood parts. Dimension stock has found a home in many industries besides those considered as prime wood users.

The Hardwood Dimension Manufacturers Association, Nashville, Tennessee lists such industries as furniture, radio-electronics-television, advertising specialties, farm equipment, toys, pianos, brush handles, recreational equipment, institutional furniture, conveyor equipment, etc.

In the United States "Rules for Measurement and Inspection of Hardwood Dimension Lumber" have been issued to bring about uniformity in classification of the various kinds of hardwood dimension lumber used by furniture, cabinet and other industries using wood parts in their finished products.

The rules and information included are condensed from commercial stan-



Partially loaded car. This is semi-dimension stock.

dards developed in cooperation with the United States Bureau of Standards and promulgated initially in 1936 as "Commercial Standard CS 60-36." These rules have been periodically revised to cover dimension for export and clarify certain requirements. Subsequent revisions were issued on February 25, 1948 (C.S. 60-48); October 15, 1951, (C.S. 60-48 revised); and April 1953 (C.S. 60-48, revised).

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The current issue was approved by the Hardwood Dimension Manufacturers Association on September 15, 1952. The promulgation, printing and jurisdictional control of these rules have been assumed by the Hardwood Dimension Manufacturers Association by unanimous approval of its members upon recommendation by its Committee on commercial standards and grading rules.

The grading rules are available from the offices of Hardwood Dimension Manufacturers Association, 218 Broadway National Bank Building, Nashville 3, Tennessee.

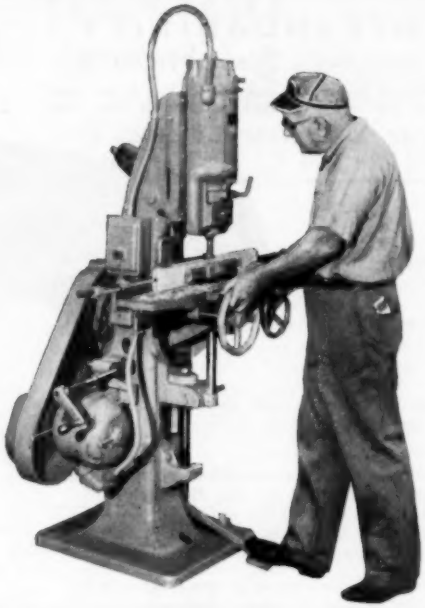
The modern hardwood dimension plant is equipped with a large volume of equipment such as cutoff saws, rip saws, gluers (high frequency or universal clamping procedures), planers, tenoners, molders, shapers, borers, mortisers, sanders, scarfers, lathes, laminating fixtures, variety saws and many others.

The hardwood dimension plant is equipped with up-to-date dry kilns and conditioning rooms, altogether with large dry storage buildings in which to store large quantities of kiln dried lumber in different grades and species, ready to be cut into any part required by the fabricator. This provides the user with plants available to produce and ship promptly.

When the tremendous investment by the dimension producers, is taken into account, it is well to consider their reliability for producing any pre-cut stock economically. The dimension producer is a specialist and can often furnish parts better and cheaper than the manufacturer can make them himself.

• • •

People who wonder where this younger generation is headed would do well to consider where it came from.



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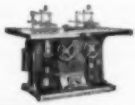

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that's how those who know wood speak of Cypress for it endures generations of fine applications in and out of doors.

Tidewater Red Cypress makes possible beautiful interiors and hand carving as on the fireplace and mantel in the Bath and Tennis Club at Daytona Beach, Florida, shown below, or the exterior of a modernistic residence in Winter Park we'll picture soon.

From Georgia Cypress swamps huge trees are felled and milled to meet an ever increasing demand.

Ask your Atlantic Man for information and prices today. For interesting Cypress stories see the February, March and April issues of your "Atlantic Log."

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EFFICIENT *Furniture* PRODUCTION

By Thomas A. Dickinson

WOODWORKERS who are fond of saying their trade is one thing that hasn't changed much since the beginning of civilization should take a look at Fernwood Manufacturing Company! This is a Los Angles firm whose owners, Max Leventhal and Dave Good, appreciate the advantages of developing and utilizing new production ideas.

As evidenced by the fact that it has employed no more than 110 workers in 60,000 sq. ft. of plant space during its seven years in business, Fernwood is not the sort of company that can undertake projects which most woodworking plants cannot afford. But it is a striking example of the sort of company that adopts ideas which other manufacturers have overlooked or ignored—quite frequently to the latters' great disadvantage.

Fernwood's activities consist briefly of converting ash, maple, oak, birch and plywood into modernistic tables, chairs, cabinets, and other items of household furniture. This basically involves the use of standard machine tools—such as a Vonnegut molder, a double-end tenoner, an automatic shaper, a Bell automatic boring machine, a Mattison automatic stroke sander, a straight-line ripsaw, a Solem three-drum sander, Oliver table and bandsaws, etc.

Parts fabricated with the latter tools are automatically transferred to their various assembly stations by a 150' belt-type conveyor. Then, mounted on a 500' belt-type conveyor, the assemblies are spray-finished with seven coats of lacquer.

Many of the things that make this procedure efficient are not sensational. For instance, the company pays less for power than many competitive firms simply because it make use of a transformer which permits the operation of electrical hand tools with alternating current from the plant's light circuit instead of with three-phase factory current.

Similarly, many production operations take place with unusual speed simply because the company has gone to the trouble of developing special jigs and fixtures which minimize the need for human effort and virtually eliminate the possibility of damage due to mistakes on the part of the production worker.

For example, a special assembly fixture enables one man to mate the components of chairs at the rate of two per minute. All the worker has to do is to dip the doweled ends of the parts in a vinyl resin glue and (after placing the parts on the fixture) depress a pedal which causes a pneumatic clamp to press the parts together. Comparable air-powered assembly tools are used in producing all of Fernwood's case assemblies.

With air-powered fixture, this man completes two chair frames a minute.

Probably the company's most unusual development involves edge-banding—a task commonly accomplished with dielectric heating facilities in other modern furniture factories of the United States. It consists of using standard 110-volt electrical heating elements to elevate the temperatures of two metal bars which serve as the clamp jaws for a pneumatic assembly fixture. A transformer makes it possible to derive power from a 440-volt circuit in operating the heating elements, output of which is controlled by a thermostat.

Spray painting a table as it is conveyed past this worker's station.

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make corners easy

by their ability to fasten securely in difficult areas. Also, the narrow crown models provide a hidden means of fastening.

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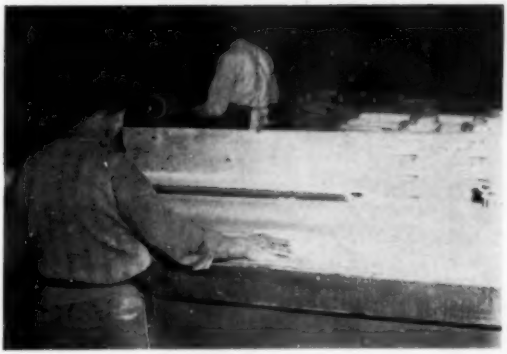

Wood furniture components are sanded with belt sander or contour sander.

The original purpose of the edge-banding setup was simply to eliminate the need for a relatively high investment in dielectric heating equipment. However, unbiased observers have asserted that it is working well here—probably because extremely thin veneers will conduct heat from any source with considerable efficiency. It is possible that the Fernwood setup is practical only because the company utilizes a fast-setting urea glue for edge-banding purposes.

In producing mar-proof tabletops, Fernwood uses a roll-coating machine to accelerate the application of a mela-

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". . . Dear Mr. Montgomery: It is an unbelievable machine and it is still hard to believe that it is actually handling the enormous volume of scrap we are feeding into it. We operate the hog without an attendant—which means a considerable saving." — J. B. BLACK, Ocala Mfg. Co., Ocala, Fla.

Sumner Iron Works, Everett, Washington, W. Coast Rep.
Canadian Sumner Iron Works, Ltd., Vancouver, B.C., Canadian Rep.

Fernwood workers rub a final wax coating on the surfaces of a finished cabinet.

mine adhesive to plastic facing and lumber core materials. Then the latter are laminated by means of the Monsanto no-clamp process.

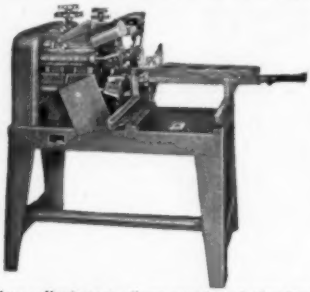
Low-temperature ovens, situated along the company's finishing line, force-dry lacquer finish coatings as they are respectively applied in order to minimize the amount of plant space that must be devoted to spraying operations. However, the final coating of bar lacquer that is applied to each assembly is allowed to dry at room temperature over a period of at least 12 hours in order to obtain a finish with maximum luster.

To reduce the possibility that finished products will be scratched or otherwise damaged before they reach their eventual destination, workers manually apply a protective coating of wax to each piece of Fernwood furniture before it is packaged for shipment.

Wood scraps are accumulated by Fernwood in quantities too small to be reclaimed with company facilities, so they are either sold to outsiders or burned.

HARRIS

DELUXE FLOOR MODEL TENONER



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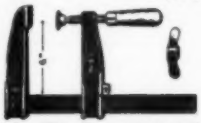


Style 6G: Deep engagement clamps. Quick acting. Take the place of "C" clamps. Speedily adjusted.

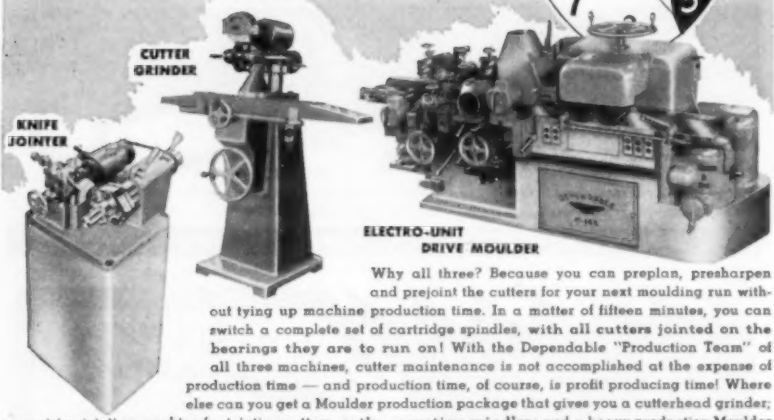
32 Clamp Styles Available.

Write for free Catalog Today.

LEFT: Double bar clamps. Prevent buckling. Especially adapted to thin work. ABOVE: Style 3G: Deep engagement clamps. Quick acting. Take the place of "C" clamps. Speedily adjusted.

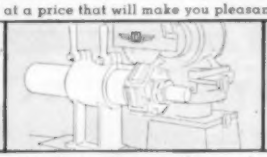
The HARTFORD CLAMP COMPANY EAST HARTFORD, CONN. Est. 1915

YOU NEED ALL 3 TO SAVE MOULDER PRODUCTION TIME...

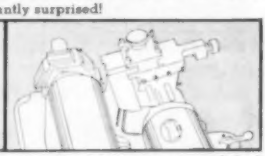


Why all three? Because you can preplan, presharpen and prejoint the cutters for your next moulding run without tying up machine production time. In a matter of fifteen minutes, you can switch a complete set of cartridge spindles, with all cutters jointed on the bearings they are to run on! With the Dependable "Production Team" of all three machines, cutter maintenance is not accomplished at the expense of production time — and production time, of course, is profit producing time! Where else can you get a Moulder production package that gives you a cutterhead grinder; a precision jointing machine for jointing cutters on the operating spindles; and a heavy production Moulder with 5000 RPM Spindles using standard motors, all ball and roller bearing construction, variable feed drive, and with hopper feed, if desired, for feeding short stock? The whole "package" is designed to save you set-up time; give you precision, jointed work; and you can run spindles and feed at precisely the ideal speed for your work. You can "Buy all 3" at a price that will make you pleasantly surprised!

See how easily the cartridge spindle unit, with head and cutters intact, can be slipped in and out for sharpening or for changes in set-up!



Note that cutters are sharpened with the cutterhead remaining on the operating spindle, using a rigid adaptor on the cutterhead grinder.



Finally, jointing is accomplished with the cutters mounted on the bearings and running at the same speed as regular production.

Dependable MACHINE COMPANY

WOODWORKING MACHINERY

GREENSBORO, NO. CAR., U.S.A.

KILN DRYING Forum

Question

We are planning to service a 40,000-foot dry kiln with an oil-fired boiler. Can you give us any idea what our oil consumption will be?

Answer

Without knowing more about this operation, the best that can be offered is a comparative installation. A lumber concern in southern New England operates two 40,000-foot kilns which are serviced by an 85-h.p. oil-fired boiler. Average oil consumption used in drying various species is about 250 gallons per day of light oil.

Question

All of our lumber is air-dried before kiln drying. A visiting kiln operator from a nearby plant has advised me to cut more heartwood samples than sapwood for better kiln drying results. What is the reason for this?

Answer

Your advisor is merely providing you with a means for sampling the highest moisture content. Heartwood always dries more slowly than sapwood, and although sapwood will have a higher moisture content in green lumber, in air-dried lumber the higher moisture content pieces will be found in the heartwood boards.

Question

I have been getting good results by using the mild casehardening or tension set method to prevent warping at the beginning of the kiln run, when drying birch and maple. I tried the same procedure with a load of beech but did not get as good results. What happened?

Answer

Your problem was referred to a kiln man with considerable experience in drying beech. He says your trouble is probably due to using the same amount of tension set for beech that you had been using for birch and maple. He advises that beech is a broader ray wood than birch or maple and requires a deeper tension set. Oak also falls in the same category.

Question

What are the proper moisture content ranges for building lumber to use in setting up kiln drying schedules?

Answer

A commercial kiln drying concern recommends drying knotty boards to a moisture content of 12% to 15% for best machining properties, upper grades to 10% or lower, and lower grades to a moisture content of 12% to 20%.

Question

I have always had some darkening of maple lumber which was not objectionable until we started using the modern blonde finishes on our furniture. Orders have come through now to dry white stock. What causes this darkening and how can I prevent it?

Answer

Authorities seem to agree that darkening of maple is due chiefly to carmelization of maple sugar under high heat. While many operators report little darkening with drying schedules calling for a maximum dry bulb temperature of 180 degrees, a Michigan kiln man with considerable experience in drying maple for blonde finishes recommends going as low as 155 degrees F. as insurance against this darkening.

One of many DAY Dual-Clone Systems installed for Curtis Companies, Inc.

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DAY SINCE 1881
DUST CONTROL
A SINGLE UNIT OR A COMPLETE SYSTEM

Question

I want to jump on our kiln operator about the stock he is drying for our chair seats but don't know exactly what the trouble is. What would the fact that these seats crack and split right after they are bored show?

Answer

Don't jump on your kiln man until you are sure he is at fault. The condition you describe, however, indicates the wood is probably casehardening. If it warps badly after planing, you can be reasonably sure that this is the trouble.

Question

How can we kill blue stain in thick lumber?

Answer

Many kiln men claim that while it will not remove stain that has already developed, holding a sustained temperature of 140 degrees F. for about 3 hours will kill blue stain in lumber up to 8/4" thickness.

Question

I have a lot of stinking swamp oak to dry and my degrade in kiln drying is always high. Is there any way that green oak can be dried consistently without defects, such as checking and honey-combing?

Answer

Opinions on proper schedules for kiln drying oak differ widely. Many operators believe much of the degrade encountered in drying oak today is due to the use of speed-up schedule high temperatures during the initial high moisture content period. Operators who consistently report best results are using slower schedules that call for starting temperatures as low as 120 degrees F. with controlled humidity until the lumber is dried down to the fiber saturation point (25% to 30% moisture content). From this point on, they use higher temperatures, up to 180 degrees F. with proper controlled humidity without getting an appreciable amount of degrade. Some operators also use humidification treatments during the kiln run to equalize against checking.

Question

We have tried vents made of both wood and metal but the maintenance required has been terrific. Are any other materials

used to make dry kiln vents which will last longer?

Answer

While complete information concerning expected service life has not been received, a plant confronted with a similar problem made up prefabricated vents on ½" 26-gauge galvanized wire screen.

Question

We recently installed an oil furnace to service our kiln as wood waste formerly used for fuel is now being utilized in the manufacture of a hardboard product. I am currently getting a discoloration on lumber dried in the kilns which I didn't have before. Could the oil burner have anything to do with this?

Answer

Similar installations investigated in reference to your problem showed all lumber had some discoloration from the oil furnace but penetration was not deep and was readily surfaced off.

Question

We have been having trouble with our kiln doors leaking. Is there any type of kiln door that is air tight?

Answer

A kiln engineer advises that doors of the insulated refrigerator type can be made completely air tight with rubber gasket seals. The seals must be changed frequently, however, to maintain an air tight condition.

Question

We use winching as a means for moving kiln trucks up from the yard, into and out of the kilns. Exposed to all kinds of weather and continual dragging, grinding and chafing of winch cables requires frequent replacement. What do other plants do to prolong the life of their winch cables?

Answer

Some plants apply a solution of heavy engine oil and powdered graphite, applied hot, for cable protection. Old crankcase oil is often used for this purpose but is strained free from grit before using. Application is usually by brush although one plant sprays the oil mixture with a portable spraying unit. One plant which uses its cable constantly under extremely wet conditions applies a solution of white lead and tallow boiling hot.

An Important Announcement

by BRADLEY

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Bradley has expanded production in its Furniture Dimension department whereby it now manufactures **fully machined dimension** in addition to its long-established output of semi-dimension.

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WARREN, ARKANSAS

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2,675,839 Straight beam adjustable jaw clamp.
A. M. Beasley.
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2,675,841 Drill.
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2,675,929 Handling system for boardlike articles.
T. T. Youngfelt. Assignor to United States Gypsum Co.
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2,675,930 Apparatus for forming stacks of boards.
T. T. Youngfelt and J. A. Besal.
Assignors to United States Gypsum Co.
Chicago, Ill.

2,677,154 Sliding panel door. Charles K. Agle, Princeton, N.J.

2,677,268 Wallboard moldings. F. Hobbs, Assig. to Research Holdings, Inc.,
Seattle, Wash.

2,677,399 Guide mechanism for power driven circular saws.
F. R. Getsinger, Phoenix, Ariz.

2,677,400 Slidable rip fence mounting. W. L. Gaskell, Assig.
King-Seely, Corp., Ann Arbor, Mich.

2,677,420 Folding Door. H. S. Kuyper, Assig. Rolscreen Co.,
Pella, Iowa.

2,677,833 Combination wardrobe and crib. N. J. Kroll, Chicago, Ill.

2,678,069 Round die for wood turning lathes. A. E. Gingras,
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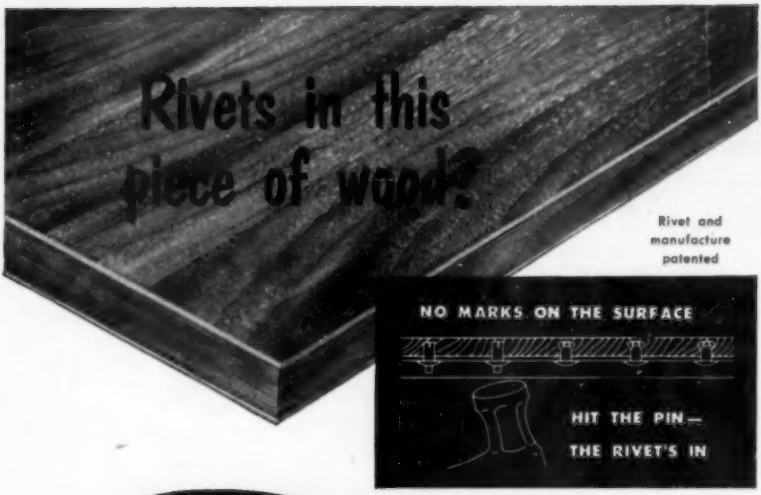

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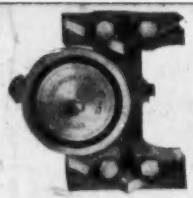
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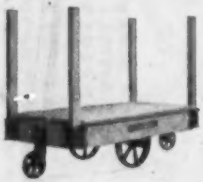
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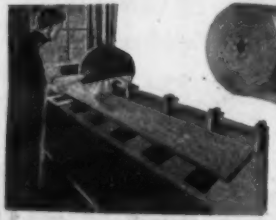
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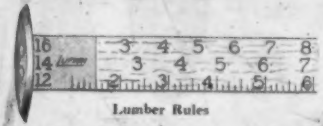
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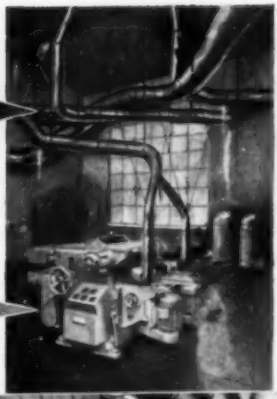

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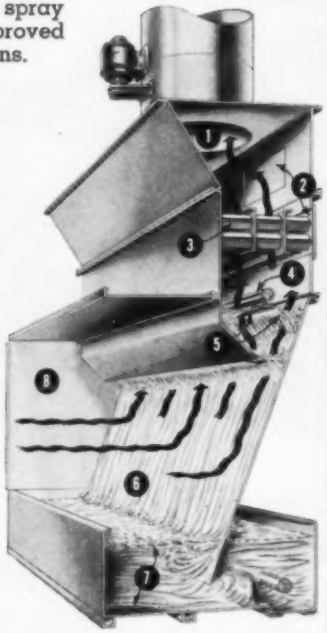

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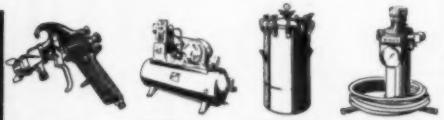

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There's Plenty NEW in SANDING WOOD

By Harvey L. Bennett

THE advances made in wood sanding in the last six years have been the greatest in history. At an ever increasing rate the trend is toward mechanization and automation. More and better sanding machines, methods and techniques are being developed to produce more and better wood products. There is indeed, "plenty" new in wood sanding today.

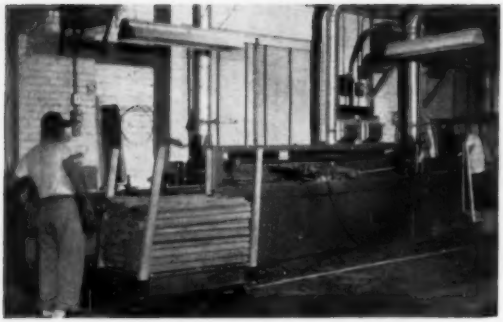
The "revolution" which is now taking place within the furniture industry began with the coming of peace in 1946. After seven lean years, during which the American industrial establishment had concentrated its every effort to developing and producing enormous quantities of war material, a great, new consumer market was hungry for long denied luxury and necessity items for the home and farm. In the hue and cry that ensued the demand for wood products was tremendous.

Television was no longer a wild, dreamy notion, but a hard, wonderful reality. Everybody wanted a TV set, and wanted cabinets to be of a quality wood and workmanship. Blonde and light-colored woods were introduced and furniture went modern. And still the old, long famous furniture styles and designs were more popular than ever.

Creating a market for its products was not the problem facing the woodworking industry. The problem was how to supply the compelling demand. Putting their heads together, the furniture, coated abrasive and machinery manufacturers came up with the answer: mechanize wherever feasible, and produce goods on a production line basis.

Today most of the larger furniture plants have (or are) mechanized the machine rooms to a point where the processing of lumber is almost automatic. The same is true in the finishing rooms. Through use of conveyers and fast drying ovens, goods are finished

Mr. Bennett is product engineer, Southern Region, Behr-Manning Corp., Troy, New York.



The Molsander is an automatic machine for sanding straight moulding such as parting rails, trim and other stock up to 10" wide.

on a given cycle without interruption. The same principle that made automotive assembly plants so successful is fast becoming a part of the furniture manufacturing scene.

Still progress in this direction continues. Shows such as the Wood Sanding Machinery Show sponsored in November, by Behr-Manning Corp., in High Point, N. C., continue to create overwhelming interest throughout the trade. Programs of this type will continue to stimulate new ideas and new techniques which will help increase production and lower abrasive costs.

Sanding moldings by pressing a shaped hand block over a running belt.

Beginning with multiple drum sanders, the following is a resume of the latest techniques and advancements in wood sanding today.

Multiple Drum Sanders

In order to keep drums in balance and felts resilient many plants are finding it profitable to fluff felts periodically (every five or six cover changes). This can be done quickly and effectively as follows:

A. Take a board 2" x 6" cut long enough to reach pressure plates on opposite ends of drum.

B. Cut out radius on board by pressing against front drum. This leaves a concave radius which will conform to convex surface of drum.

C. Glue slip of paper 80-E (1/0) to concave surface of board.

D. With felts exposed and drum running slowly, press board against felt lightly; thereby sanding down high spots and preventing felt matting.

E. Caution—be certain felt is bound tightly on drum to prevent bursting.

Since the purpose of the front drum is designed for cutting down machine marks, it is important that a thinner, denser felt, usually ⅛", be used. The remaining two drums, of course, are designed to modify the scratch pattern from the front drum. This leads more

Close-up of Pearson sander shows a flexible belt running over a formed rubber wheel to sand the molded edge of an oak pew panel. Idler pulley mounted behind the head of sander permits use of cooler cutting, flexible cloth belts on molded edges.

to a blending and polishing action rather than heavy cutting, therefore softer, more resilient felts should be used. The use of 3/16" felt on the second drum and ¼" felt on the third drum has proven to be most satisfactory.

Post Sanding

When cutting down the tip on the top of bed posts, in order to maintain a uniform scratch pattern, we recommend the use of a jig comprised of two sets of rollers, one set is mounted at the front, and one set in the rear to hold the post. The jig is then mounted adjacent to a side stroke sander, with the post positioned diagonally to the free running belt, enabling the post to spin when the operator applies pressure to the back of the felt with the aid of a felt pad. The result is a circular scratch pattern and finish comparable to the finish acquired through use of the Nash automatic turning sander on the main section of the post. The advantage with this method is a more uniform finish, free of unsatisfactory dark spots when the posts are stained.

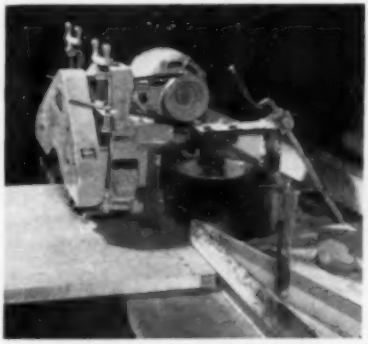
Automatic Molder

To reduce re-handling on drawer sides an effective method of sanding the radius on the top edge of drawer sides, automatically, while being shaped on the molder has been developed. The setup for a conversion of this type is relatively simple. By mounting a small sanding unit comprised of a drive pulley and an idler pulley with a stationary form block, or a grooved rubber contact wheel mounted between the two pulleys shaped to fit the desired radius, and through use of a flexible cloth belt, preferably Openkote aluminum oxide cloth Singleflex, each piece is sanded uniformly.

A similar setup is presently in the process of being developed for the tenoner machine, through which it will be possible to automatically edge sand flat, as well as contour edges, on table tops and other related pieces as they are cut and shaped on the tenoner machine.

Edge Sanders

A method for automatically edge sanding has now been developed. By



Automatic edge sanding with the E-Z feed attachment results in an improved sanding job due to uniform pressure and constant feed.

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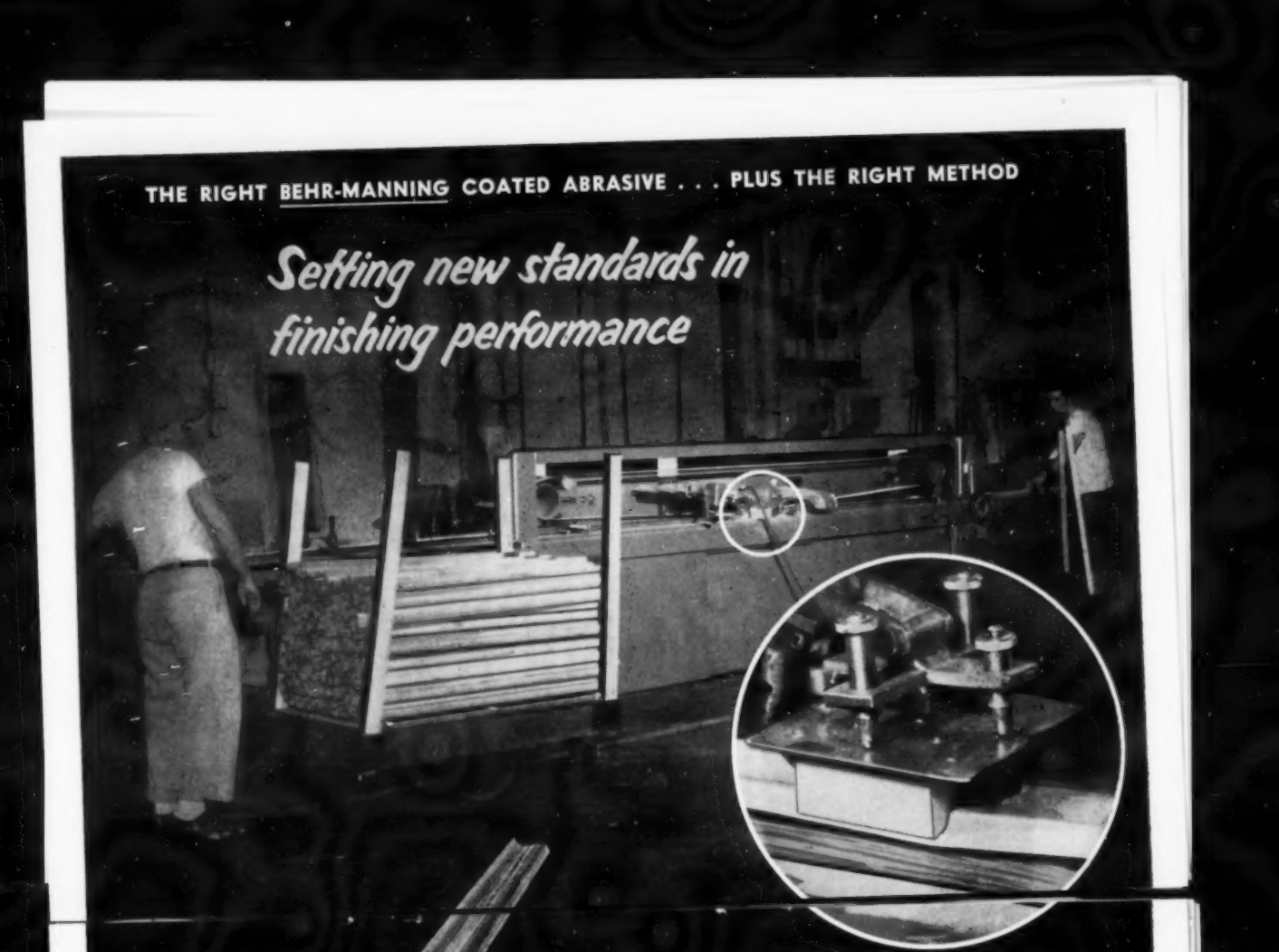

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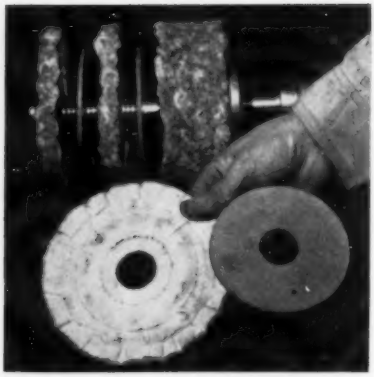

Close-up of sectional buff wheel wherein the density can be altered through insertion of cardboard spacers between the buff sections.

attaching a portable automatic feed unit such as the E-Z feed, made by the King Manufacturing Co., Corinth, Mississippi, and mounting a resilient rubber contact wheel, 70 durometer, between the two pulleys, in conjunction with guides mounted on the work table leading to and away from the wheel aligned similarly to the guides on a shaper; the stock can be fed automatically to the wheel and sanded. The result is an improved sanding job due to uniform pressure and constant feed.

Many plants are finding it profitable to use paper belts in place of cloth on a number of operations. Paper belts are only half the price of cloth and surprisingly will cut much faster than cloth. However, there are precautions that should be taken for maximum results.

A. Run over free running pulleys, too much heat generated when run over stationary block. (There are some plants, however, using paper on stationary block machines successfully.)

B. Align side platens with pulleys to minimize friction.

C. Pulleys should be in balance to prevent excessive vibration.

D. Loosen tension after new belt has been in operation approximately 10 minutes. Reason being that paper has tendency to draw, whereas cloth stretches.

Plans are presently being made for the utilization of a table actuated by air cylinders similar to that used on an automatic shaper, for use in edge sanding table tops. The major modification would be in replacing the cutting head with a resilient rubber contact wheel and mounting an idler pulley behind the head, thereby enabling an abrasive belt to be used. This type of setup would be particularly effective on straight edges where you have rounded corners.

Automatic Stroke Sanders

Automatic stroke sanding equipment is becoming increasingly popular. There are two general types of automatic equipment, the first of which are completely automatic machines as manufactured by Curtis Machine Co., Jamestown, New York and Wysong & Miles, Greenboro, North Carolina; and sec-

Conversion set-up automatically sands the radius on the top edge of drawer sides without rehandling.

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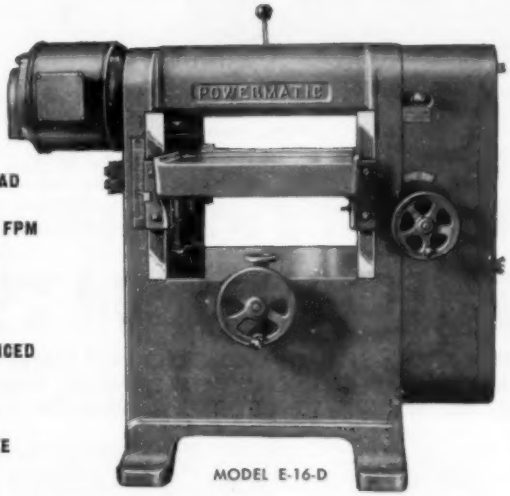


MODEL E-16-D

Powermatic proudly presents its most sensational machine in over 25 years of manufacturing experience. The Model E-16-D, Direct Drive 16" single surfacer was created by popular demand and this twin sister to the E-16 Belt Driven machine offers performance plus; the cabinet makers dream, the production plants ideal. Write for complete information.

Manufactured by

POWERMATIC MACHINE CO.

McMINNVILLE, TENNESSEE

Latest development in pump drum sanding is the sectional buff wheel and abrasive belt method of sanding rounded wooden parts.

ondly the automatic stroke conversion unit made by Curtis Machine Company.

The conversion unit is a fully hydraulic system wherein the unit can be mounted on standard lever stroke or hand block type sander and converted to fully automatic machines. The advantage of the conversion unit being the utilization of semi-automatic equipment, thereby holding down conversion costs. These units can be made in various sizes to suit the specifications of your present equipment.

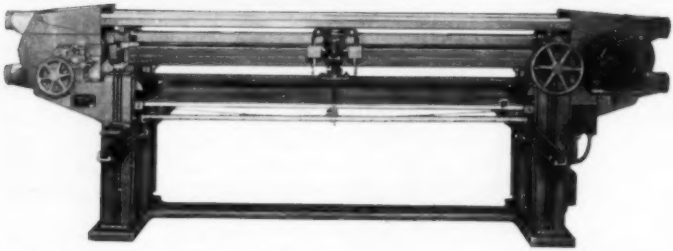
As an example of savings which can be realized from these conversion units, one manufacturer reported that the initial cost represented $4,500, and in one year calculated they had realized a saving of $11,000.

These units are not confined solely to flat sanding as it is possible to sand pieces such as church pew seats which have a serpentine type contour, through use of foam rubber pads.

Much improvement has been made with semi-automatic lever stroke sanders such as machines manufactured by

The OAKLEY D-1 DOUBLE BELT SANDER

• CUTS DOWN • POLISHES • ELIMINATES DRUM SANDER ON VENEERED STOCK • ELIMINATES RAISED GRAIN • ELIMINATES SPONGING • PRODUCES SUPERIOR QUALITY
ALL ACCOMPLISHED AT ONE OPERATION SEMI-AUTOMATICALLY AT HIGH SPEEDS



With a single handling, the Oakley D-1 Double Belt Sander removes the tape, polishes, eliminates raised grain . . . without sponging or glue sizing . . . and the stock is ready for the finishing room. This is only one of the many quality sanding machines designed and built by Oakley for the woodworking industry. Write today for full information.

THE OAKLEY COMPANY
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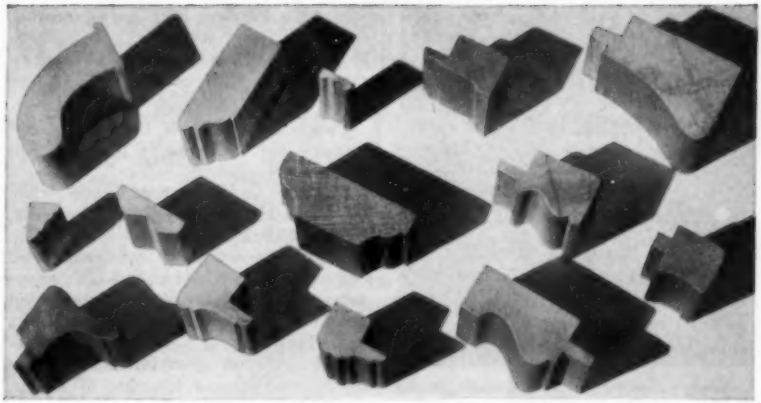

Longer-lasting 3M Garnet Cloth Belts sand any moulding shape better, faster!

Note the intricate contours of these mouldings, the sharp "knife" edges and valleys. Sanding shapes like these is a tricky job—done perfectly with 3M Garnet Cloth Jean belts.

3M Garnet Cloth belts are faster-cutting than ordinary mould sanding belts, and longer lasting. Reason for this is superior grain anchorage, making them resistant to mineral peeling, the commonest problem in mould sanding.

And 3M Garnet Cloth belts are more conformable—they flow smoothly over a "knife," retain their shape far longer than ordinary belts. Perfect for fixed, hand or automatic sanding, they require only light pressure because of their extra sharpness. The *belt* does the work.

Yes, for any mould sanding job, you'll be money ahead with 3M Garnet Cloth Jean belts—longer-lasting, faster-cutting, more conformable than any other moulding sander belt on the market today. Be sure to specify 3M every time you order. For further information send for booklet "3M System of Furniture Finishing," using coupon below.

The final finish mirrors all previous operations

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Made in U.S.A. by Minnesota Mining and Mfg. Co. General Offices: St. Paul 6, Minn. In Canada: London, Ont., Can. Export: 122 E. 42nd St., New York City. Makers of "Scotch" Brand Pressure-Sensitive Tapes, "Scotch" Brand Magnetic Tape, "3M" Adhesives, "Underseal" Rubberized Coating, "Scotchlite" Reflective Sheeting, "Safety-Walk" Non-slip Surfacing.

MINNESOTA MINING AND MFG. CO.
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☐ *Send me the booklet "3M System of Furniture Finishing"*

☐ *I'd like to talk to a 3M Salesman*

NAME.....TITLE.....

COMPANY.....

ADDRESS.....

CITY.....ZONE...STATE.....

Sanding panels on the automatic stroke sander manufactured by Wysong & Miles, Greensboro, North Carolina.

Oakley Machine Company, Bristol, Tenn. They have developed their machines to operate at high speeds, 7500 s.f.p.m. In addition, they are advocating the use of king-size shoes, upwards to 20" long, which permits covering a greater area with each stroke.

Open Drum Sanders

Two new machines have been developed as replacements for the open drum type sander.

The first is the contact sander made by Murdock Machine Co., Statesville, North Carolina, which comprises a large 14" diameter, 12" face compressed canvas contact wheel over which paper belts are run. This unit has the decided advantage of being free from bumping and chattering as is generally experienced from the open jaw on an open drum sander, and the use of cooler, faster cutting belts. The difference in the rate of cut is such that it is recommended that a grit finer be used on this machine.

Another major improvement in this type of sanding is the Shapesander

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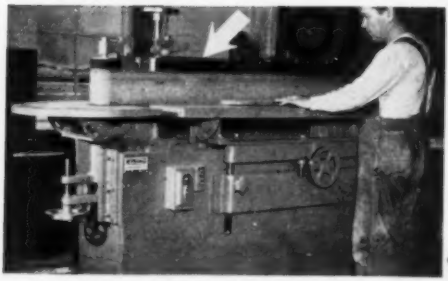
Here's a Message for You!



GRAPHITE COATED CANVAS . . . reduces friction and acts as a lubricant against the back of sanding belts . . . resulting in a better, faster job. Sanding belt manufacturers recommend GRAPHITE COATED CANVAS because of these features plus the fact that sanding belts will last longer. Can be used on hand blocks, endless belt sanders, automatic stroke sanders, edge sanders and chair back sanders. Send today for sample and full details.

Showing use of Graphite Coated Canvas on equipment made by Wysong & Miles Co., Greensboro, No. Carolina.

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SINCE 1876 (Mfd. under U. S. Pat. No. 2591904)

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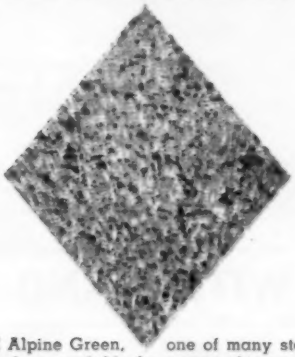

PLEXTONE Alpine Green, one of many standard pre-mixed colors available for prompt shipment. Also available in solid colors and in custom multicolors.

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COLOR-FLECKED PLEXTONE is a new industrial finish in which colors exist separately until sprayed, when they interlace as shown above.

CHARACTERISTICS

Lacquer base • Air dries approx. 30 minutes — dries hard 2 to 3 hours • Available in flat or semi-gloss • Good chemical resistance • Exceptional hiding power • Does not stain • Resists wear, chipping, cracking • Can be scrubbed, even scoured • Can be touched up without showing • Thicker film hides surface imperfections, covers porous materials • Available in non-toxic grades • Bonds readily to wood, wallboard, paper, cement, plaster, phenolic impregnated paper-mache forms, plastics, woven fabrics, and metals such as cast iron, steel, aluminum, brass, copper.

PLEXTONE—CUTS FINISHING COSTS UP TO 35%

Eliminates much costly pre-finishing, hides surface flaws. Usually only one prime, one PLEXTONE coat required!

PLEXTONE — UNBELIEVABLY RUGGED!

Color flecks go "thru-the-film," resist abuse, defy alcohol, grease, oil. Can be washed, scoured, without damage!

PLEXTONE — SALES APPEAL OF *MULTICOLOR!*

Endless new effects of 2, 3 or more colors sprayed from one gun, at one time . . . tone-on-tone, spatter-dash, etc., etc.

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2115 McCarter Highway, Newark 4, New Jersey

Gentlemen: Please send me FREE color chips, PLEXTONE sample, and application data.
I am particularly interested in PLEXTONE for finishing _____

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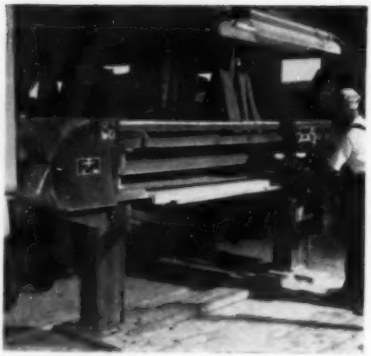
made by Timesavers, Inc., Chicago, Illinois. This machine has an automatic feed roll, thereby permitting stock to be fed automatically into the machine. It is designed to sand solid and pressed plywood stock. The machine is particularly effective on chair backs, auditorium seats and related pieces.

Pump Drum Sanding

Due to the high abrasive cost of pump sanding we have recently developed a sectional buff wheel wherein the density can be altered through use of spacers placed between the buff sections and a 9" tension idler which can be mounted on the floor or wall, thereby permitting use of faster, cooler polishing belts. This, of course, has the advantage of reducing abrasive costs and tendency to glaze and burn. Furthermore, the high abrasive cost of pump sleeves is due primarily to the joint joining charge rather than the actual abrasive itself.

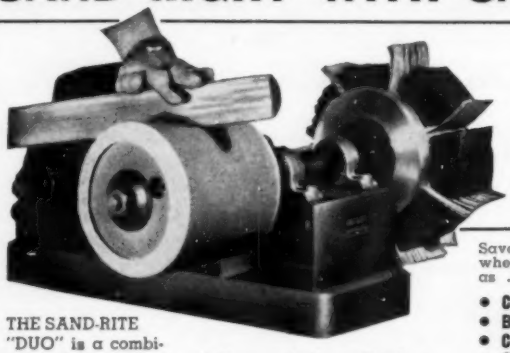


Oakley Machine Company has developed their semi-automatic stroke sanders to operate at high speeds, 7500 s.f.p.m.

Mold Sanding

Mold sanding is perhaps the most troublesome type of wood sanding. Much progress has been made, how-

SAND RIGHT WITH SAND-RITE



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Triple Drum Sander finishing wooden doors. Fluffing felts periodically keeps them resilient, thus producing a better wood finish.

ever, toward increasing production, as well as finish, through use of machines.

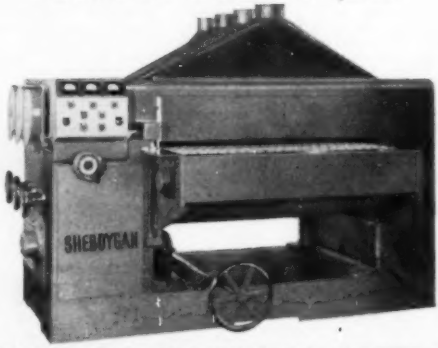
The Molsander made by Bouligny Company, Charlotte, North Carolina, is an automatic machine for sanding straight molding. This unit has proved very effective, for handling stock up to 10" wide. This machine is very versatile, inasmuch as it is possible to use as many as three heads at one time, mounted in tandem and using the same belt in order to cover a complex molding with a single operation.

Several plants have been successful in sanding complete drawer fronts with a two-head machine. This is accomplished by having one block cover one edge and the other block cover the opposite edge, and designed so that the two blocks will overlap, thereby sanding the face of the drawer front, and giving a uniform blending job.

Due to the frictional heat which develops, causing premature breakdown on the abrasive belt, when run over a stationary form block mounted between the drive pulley and idler pulley, success has been found through use of

SHEBOYGAN

Endless Bed Sander



SHEBOYGAN MACHINE COMPANY

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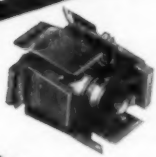
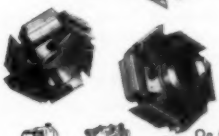
Off the drawing board

or off the shelf





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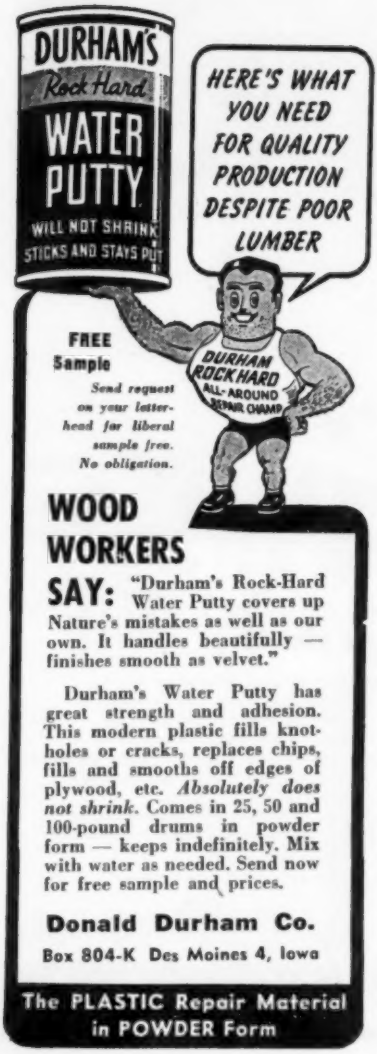
WABASH, INDIANA • U.S.A.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Durham's Water Putty has great strength and adhesion. This modern plastic fills knotholes or cracks, replaces chips, fills and smooths off edges of plywood, etc. Absolutely does not shrink. Comes in 25, 50 and 100-pound drums in powder form — keeps indefinitely. Mix with water as needed. Send now for free sample and prices.
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The PLASTIC Repair Material in POWDER Form

formed rubber wheels being used in place of the stationary form block. The wheels which are easy to shape accurately revolve freely from the motion of the belt.

The Pearson model "A" sander, which is a spindle type sander, using formed rubber wheels in conjunction with strips of flexible cloth wound around the head, have recently modified their machine for sanding simple, shallow molding, by mounting an idler pulley behind the head, thereby permitting use of flexible cloth belts. This naturally reduces tendency to burn through use of faster-cooler cutting belts over the short strips of cloth. However, the use of the flexible belt is limited to simple, shallow type moldings. This is due to the fact that when cloth breaks around a small diameter wheel then attempts to break into a sharp groove, the cloth has a tendency to crimp.

Perhaps the greatest skill in mold sanding is the ability to make a satisfactory hand block for mold sanding. The easiest, and perhaps most accurate method, which we feel has been developed is as follows:

A. Take a soft block and cut out the specific molding oversized on a band saw.

B. Take a short strip of the molding and position it in the center of the cut-away section on the block and seal it.

C. Place short strips of band saw steel at the corners where there will be greatest tendency for wear.

D. Pour babbitt and permit to cool.

E. Remove strip of molding and sand down corners of babbitt.

F. Result—a perfect shape mold with a minimum of effort.

There are two different types of flexible cloth, "J" weight or jeans cloth and finishing cloth. Both types are available in three flexes, Singleflex, Doubleflex,

"It's simple, always cuts true and you can't wear one out!"

Users say: "The more you know about cutter heads, the more you appreciate the way a Jones & Orth head is made!"

When you take one apart—check its design and construction — you get a better idea of why they perform as they do.

Take our popular H-Type head for instance, such as the eased-edge model shown at the right. Knives on this head can be used right down to the last ¾ inch without change of pattern OR cutting angle!

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and Tripleflex. The concensus has been in the past that the more complex the molding, the more flexible the cloth has to be. Today we realize that that is not the case. We recommend that jeans or finishing cloth, Singleflex, be used in almost every case. The reason for this is two-fold: one, in preforming a belt in which the belt is creased to conform to a specific molding by using Singleflex cloth there is enough body left in the cloth so that the cloth maintains the shape to which it has been preformed. This is true in every day life when you compare a starched shirt to a soft collar shirt, since the starched shirt maintains its shape longer. Secondly, the more the cloth is flexed the shorter the sanding life, therefore, Singleflex cloth will give you maximum sanding life.

On simple moldings "J" cloth Singleflex is recommended. On complex moldings, the use of finishing cloth, Singleflex, which has a more pliable backing, would be preferred.

There is a trend among plants today to conveyorize sanding rooms. It may be expected that within the next few years techniques for processing dimension stock through the sanding room will be handled as effectively as it is now done in the machine rooms and finishing rooms.

From the foregoing resumé one can appreciate that much has been accomplished in a relatively short period of time. Through the medium of exchanging ideas, we are certain that this progress will continue.

Most people consider sanding as a "necessary evil." Our goal is to take the evil out of sanding. With the cooperation of the plant personnel and the machinery manufacturers, we are confident that this goal will be reached. Wood sanding methods and techniques will be kept new and modern!

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Use the hot-spray process for a fast-drying, highly serviceable finish that cuts finishing costs! Your product benefits from all the well-known qualities of lacquer plus the remarkable advantages of the hot-spray technique:

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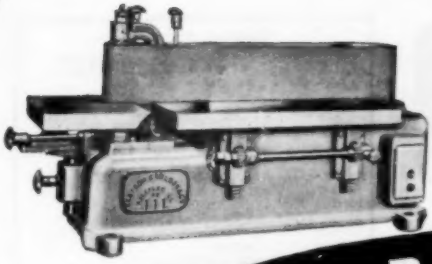

No. 111

No. 111 is furnished as a bench model or on a sturdy floor stand.

EDGE BELT SANDERS

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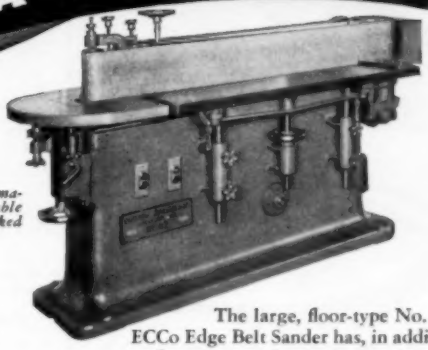

No. 112

No. 112 is a single-side machine, No. 112A has double backboards and can be worked at from both sides.

WRITE FOR LITERATURE

Learn all about the interesting details of ECCo Edge Belt Sanders. Write today for copies of Bulletins 111 and 112.

CONDENSED SPECIFICATIONS		
	No. 111	No. 112
Work Table Size..	8"x26"	11"x60"
Abrasive Belt Travel FPM.....	3900	4400
Vertical Adjustment of Table...	5"	4"
Height of Table in Lowest Position.	13"	35"
Space Required (With End Table)	20"x52"	28"x92"

The large, floor-type No. 112 ECCo Edge Belt Sander has, in addition to many refinements, an important outstanding feature — the oscillating backboard, the motion of which is synchronized with the oscillation of the belt. This results in a cooler-running belt, longer belt life, and greater sanding power through higher efficiency. The smaller No. 111 machine is a portable unit, available for bench mounting or on its own floor stand, and ruggedly built for *heavy duty* service. The need for a portable machine is amply demonstrated by the large number now in service in prominent woodworking plants of many kinds.

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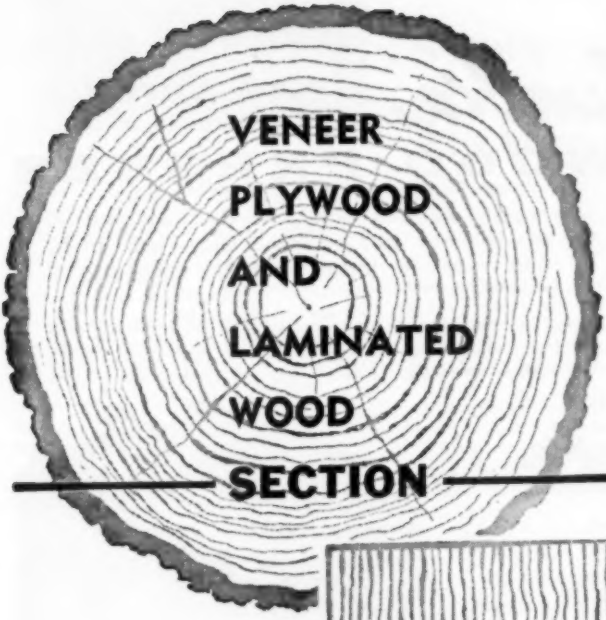

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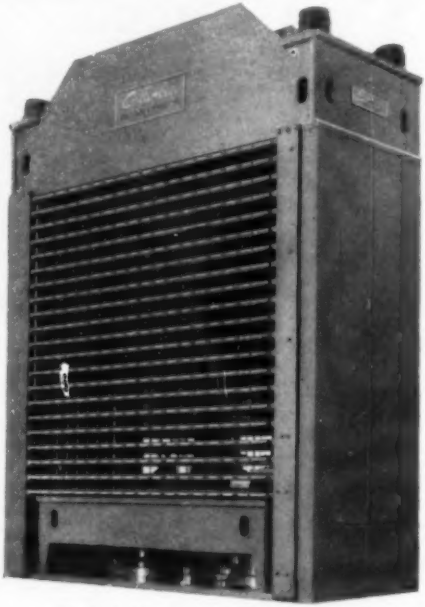

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WOOD WORKING DIGEST

PLYWOOD *Is Better...* Sizes of Plywood

By Thomas D. Perry

WOOD is a remarkable raw material, which nature has made available almost everywhere in the world. However, lumber, the major product into which timber is normally converted, exhibits some unusual characteristics, i.e., it may have substantial lengths, but there are distinct limitations on widths that are practical to use. Occasionally a large log will yield a board 24" or 30" or even wider, but the shrinking and warping tendencies of such wide boards are serious handicaps in their utilization. Therefore it is necessary to rip them into narrower units to reduce these hazards. The fact that such wide boards almost inevitably have defects, such as knots, splits, doze, pitch-pockets, etc., is another reason for ripping them and upgrading the narrower boards. As a result very few boards as wide as 12" are commercially available, and 8" would probably represent a reasonably fair average of width.

Plywood, on the other hand, is glued up from rotary cut veneer and can be produced in sizes that are limited only by the capacity of the lathes and hot presses. While the standard plywood panel is 4' x 8' with a few as large as 5' x 12', two or more panels can be spliced with scarfed joints into as large areas as can be handled. Properly made scarfed joints will usually exhibit between 80% and 90% of the strength of solid plywood, and the area lost in scarfing averages less than 10%.

Plywood, in addition, reduces the handling, requires less nailing or other fastening, exhibits fewer edge joints, and is more stable dimensionally than is lumber. The range of shrinkage and swelling in lumber may run as high as 5% in width, between 5% and 30% moisture content.

Among the advantages of plywood, limiting them in this article to factors that are related to size, are three major groups, viz.: advantages of increased area; advantages of reduced thickness; and advantages of reduced weight.

There are additional minor advantages, branching out from these majors, such as unbroken surfaces, curving facility, reduction in number of joints, distribution of strength, and others, but they are closely interwoven with these major size characteristics.

Established customs and normal limitations require that sawed boards of lumber be long, relatively narrow, as well as of substantial thickness and of considerable weight. These limitations of width, thickness and weight can be greatly reduced by peeling the log into veneer and gluing the veneer into plywood. These are the points that are emphasized in this article, indicating some of the advantages that plywood offers to users of wood.

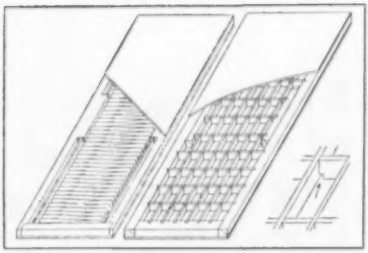

Fig. 1. Semi-hollow flush door by Roddis.

Area Advantages of Plywood

This area advantage of plywood is distinctly useful in many applications where plywood more adequately meets construction and service conditions than does solid lumber. This is particularly true in the structural uses of softwood, although it is also an important factor in hardwood plywood.

A conspicuous example of the advantages of softwood plywood, in comparison with lumber, is in the making of concrete forms. Here the rule is to use a special grade of form plywood, 4′ x 8′ in size, which has treated surfaces and edges to retard the penetration of moisture from the concrete. The favorable contrast with many narrow boards and the infinite amount of nailing required at many joints is entirely obvious and needs no emphasis. The resulting concrete surface, with plywood, will be far smoother than when lumber is used, and there will be very few of the "fins" of concrete that occur at the joints and are difficult to remove.

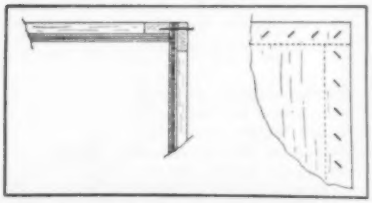

Fig. 2. Nailed corner in plywood shooks.

Then again, large sheets of plywood can be bent to desired contours in easy flowing curves. No two boards will bend alike, splits are likely to occur, and the degree of possible curvature is very limited. Curved forms without the benefit of plywood are a most difficult task. These curved forms usually require long sheets of plywood, scarfed end to end, and greatly facilitate the making of arches and "T" columns. The Douglas Fir Plywood Association of Tacoma has available schedules indicating radii that are permissible with different thicknesses of plywood.

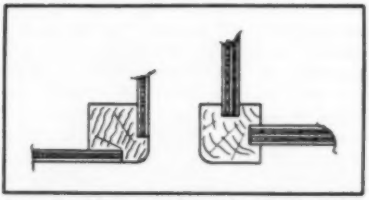

Fig. 3. Frame plywood construction. Left: glued to recessed corner post; right: grooved to hold ends and edges of plywood.

Concrete form plywood, if removed with care, can be reused a number of times. In many cases, the same plywood, after use in plywood forms, can be used for sub-floors, sheathing or roof boarding.

The availability of large plywood areas is equally desirable in many other structural uses, where the reduction in joints and nailing are of importance, and smooth, strong, tough and unbroken surfaces are essential. Examples are siding, partitions, ceiling, sheathing, roof boarding, enclosures, and the like in houses, industrial, commercial, and farm buildings, where the area and sturdiness of plywood are distinctly superior to lumber for the same uses. The promotional campaign of the Douglas Fir Plywood Association has efficiently emphasized these forms of utilization, and it supplies, for the asking,

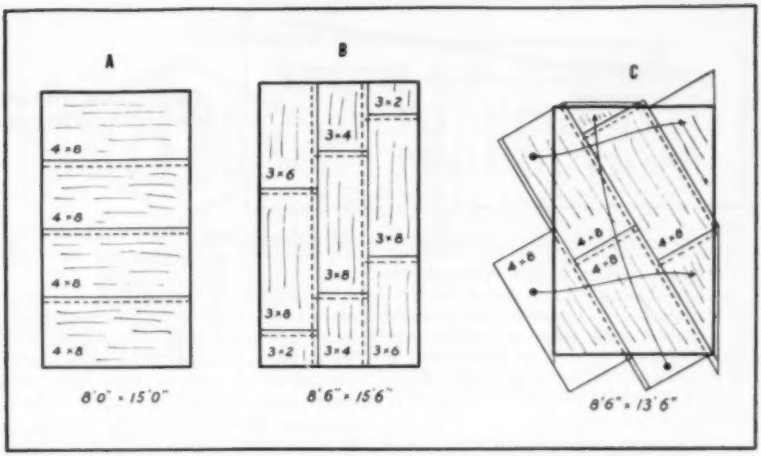

Fig. 4. Large sheets of plywood with scarfed joints. A: sidewise scarfing; B: endwise scarfing, with staggered joints; C: angular scarfing with staggered joints.

a number of practical bulletins for architects, engineers and prospective users.

Plywood has proved itself to be indispensable in the rapidly growing prefabrication industry, where lumber presents many problems in reducing labor costs.

An illustration of the advantages of hardwood plywood is that of interior paneling. When only lumber was available, before plywood was developed commercially, interior panel effects were limited to small sizes and elaborate framing, to mask the inevitable shrink and swell of the wood. Such paneling was very costly and only possible for the wealthy. Now that plywood is available in large areas, the situation is entirely changed. Even a cottage can have paneled rooms in a wide variety of framed or smooth modern designs at a moderate cost. Manors and mansions can also enjoy beautiful figured plywood paneling in artistic designs, which were never possible in solid wood.

Another example in hardwood plywood is for counter fronts in stores, where long and attractive display counters can be erected with few, if any joints. Office partitions are another instance where large plywood areas can be provided with attractive veneer surfaces. These are easily moved and reerected, as is so often necessary in the inevitable shifting trends of modern commercial life.

Thickness Advantages of Plywood

Size, in its broader interpretations, refers not only to the surface area, but applies with equal force to thickness. Every woodworker is familiar with the fact that commercial 4/4 lumber is frequently much too thick, overly strong, and unnecessarily bulky. However, thinner than 4/4 lumber, except perhaps in box shooks and cabinet interiors, is seldom available and saves very little in cost. There are innumerable applications where ¼" or ⅜" plywood will serve as well, or may even be preferable, to 4/4 lumber, and pro-

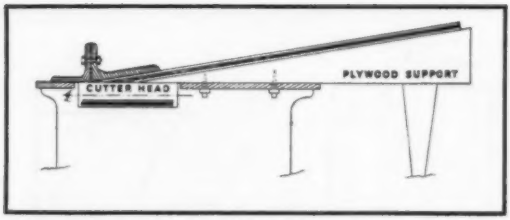

Fig. 5. Cutter head and tilted table for scarfing.

vide all the strength required. One of the important aspects of this situation is the conservation of raw material, the standing and growing forest timber. If one quarter or one third the amount of wood, in the form of veneer and plywood can serve the purpose, it stretches out our standing timber. Such conservation will benefit future generations of wood users.

The thinner types of plywood have probably found one of their most important applications in the interiors of a wide variety of cabinets, where thin solid wood is apt to shrink and split, the thicker wood will be unsightly and take up valuable space. Those who have examined antique furniture, and most of us have, recognize the frailty of mirror backs, dust backs, and drawer bottoms of thin solid wood. Plywood has completely changed this aspect of furniture making, with conspicuous improvement in appearance and servicability.

The makers of toys and sports equipment are large users of thin plywood, since it is more rugged than thin solid wood. Manufacturers of packaging prize thin plywood, because it provides complete closures, can be nailed without splitting, provides sturdy bracing, is tough under rough handling, and is light in weight.

Another illustration is that of the semi-hollow flush door which recently has attained such popularity for small homes. Here the contrast is with 6/4 or 8/4 lumber for 1⅜″ or 1¾″ thick doors. In general the construction of such doors consists of 3/16″ plywood "skins" glued to outer lumber frames, and supported between the frame members by wooden grids or edgewise ve-

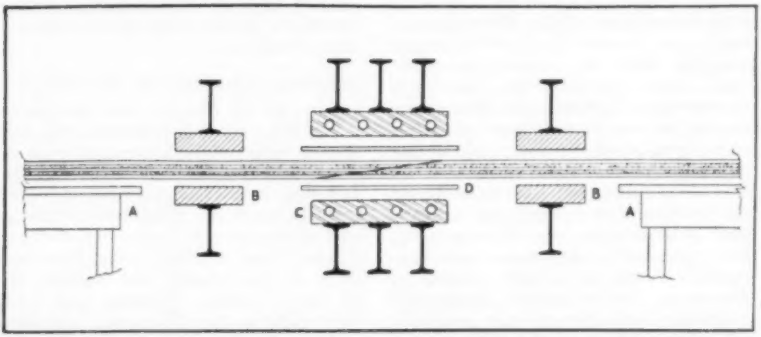

Fig. 6. Functional diagram of a scarfing press. AA: infeed and outfeed table; BB: clamps to hold scarf joint in alignment; C: hot plates to apply bonding pressure; D: aluminum cauls to prevent edge depression on plywood.

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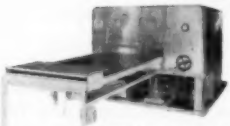

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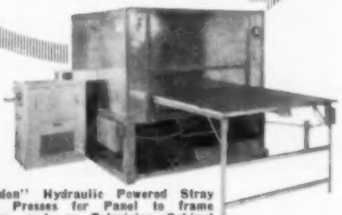

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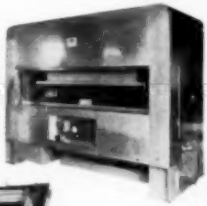

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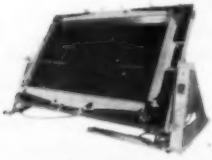

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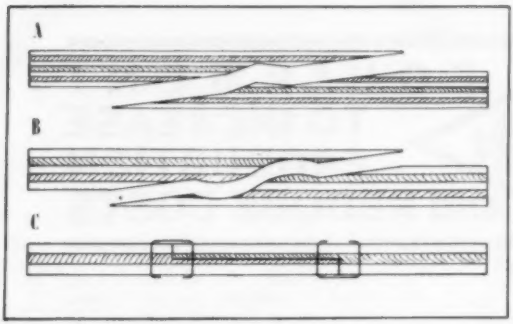

Fig. 7. Edge view of self locking scarf joints. A: unlike contours; B: reversible from single cutter head; C: square scarf with staples.

neer strips, all as illustrated in Fig. 1. Here the amount of wood actually used (including allowance for frame and intermediate members) is less than half that required for a solid door made of lumber, and the conservation of an important raw material is emphasized.

This stretching out of our timber resources can be approached from another direction, i.e., what will a typical log produce in plywood, as contrasted with lumber. Assume for example, a log 18" in diameter, 16' long, straight and free from defects. Such a perfect log may not exist, but as any defects will have the same effect on either type of product, such a comparison will still be fair and realistic.

Cut into rotary veneer, a log 18" d. x 16' l. will produce:

⅛" veneer, sq. ft.	1,206
1/16" veneer, sq. ft.	2,412
¼" plywood, sq. ft., gross area	1,206
¼" plywood, less 10% trim waste, net, sq. ft.	1,085
¼" stock panel, 4'x8' has area of, sq. ft.	32
Number of stock panels in lot, units	33

Cut into sawn lumber, a log 18" d. x 16' l. will produce:

No. of boards, 4/4 thick, 16' long	28
Width Range	4" to 10"
Total boards in lot	244
Average footage (bd. ft.)	8.7

This indicates that plywood provides over four times the coverage (1085/244 =4.4), and can be erected with only one quarter as many end and edge joints (32/8.7=3.7).

Weight Advantages of Plywood

This is a supplementary factor in the conservation of raw material, referred to under the next preceeding heading, but it adds emphasis to its importance. Weight is a problem of considerable magnitude in handling, during both manufacture and use. It is of special consequence in holding down transportation costs.

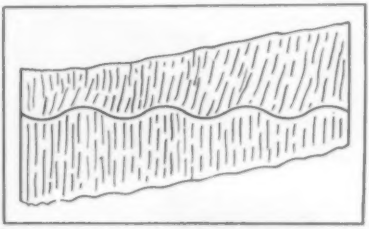

Fig. 8. Surface view of corrugated scarf.

Wherever ¼" or ⅜" plywood will serve instead of 4/4 lumber, the weight will be reduced to less than half. This allows for the reinforcing members at the ends and edges of the plywood, such as will be needed in assemblying thin plywood into sturdy cabinets, boxes or structures.

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A graphic illustration can be found in the plywood shook, which has lumber strips nailed or stapled at ends and edges. Sometimes in heavy packages additional strips, serving as stiffeners, are nailed between the outside strips. Such a construction is shown in Fig. 2, which provides sturdy nailed corners and a tight closure. It reduces the package weight to much less than half that of a lumber box, depending on the thickness of the plywood, which is likely to vary from 1/9" to 3/16".

Another example of thin plywood in a framed end for a cabinet is illustrated in Fig. 3, with two different methods indicated. In both cases the plywood is supported by strips or posts of inch square lumber, which serve as assembly members. In the left sketch the ¼" 3-ply panel is glued to the post. At the right the 5/16" 5-ply panel is supported in the groove. There are several other methods of using this principle of plywood framing.

The hollow plywood girder was an important factor in airplane and PT boat design, consisting of thin plywood webs glued to timbers, the plywood often having its grain at 45° to the length of the timber. While not as strong as solid timbers of the same dimensions, its strength/weight ratio was surprisingly high.

Similar stressed skin constructions give excellent results in roof girders for wide spans, as for aircraft hangers and other industrial structures. Plywood with scarfed joints is particularly favored for hollow girders over wide spans.

Plywood vs. Lumber Costs

Cost comparisons between 4/4 solid lumber and ¾" plywood, or for that matter, plywood of any thickness, are quite involved and depend on many interrelated factors. Then again such comparisons on a cubic content (of wood) basis may be misleading, since

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the lighter plywood construction, containing much less wood, often has adequate strength. There are many instances where a 4/4 lumber construction will be more costly than a plywood construction of equivalent strength and suitability. In addition plywood presents a better appearance, is free from edge joints and often is preferred. It is quite obvious that plywood of the same thickness as solid 4/4 lumber is more costly, because of the glue and labor added to the cost of the wood during fabrication.

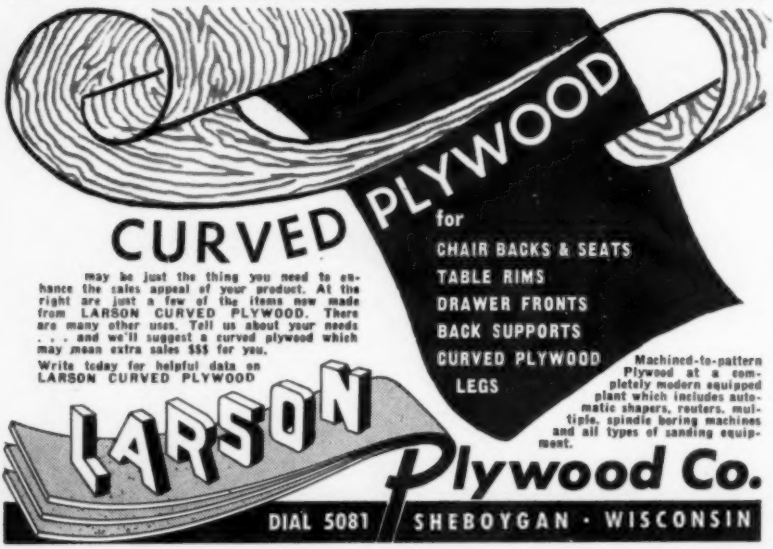
It should be noted that cost between lumber and equivalent plywood is not the only comparative factor involved. The many advantages that plywood has to offer often justify substantial price differentials.

Scarf Jointing Techniques for Plywood

It has been pointed out several times in this article that scarf jointing provides a practical method by which plywood can be spliced into as large sheets as can be handled, without sacrificing more than about 10% of the strength factors of the plywood, or more than around 10% of its area. This process applied chiefly to structural plywood, where the line of the scarf joint, under painting, is of little consequence. Scarfing is seldom used in decorative plywood, unless the joint can be masked by moldings or grooved effects.

Scarf joints may be edgewise or endwise or at an angle, several examples being shown in Fig. 4. Angle scarfing often permits sharper curves than when joints are parallel to the axis of curvature. Most of the off cuts in angle scarfing can be utilized as is shown by the arrows in the illustrations.

The rule for obtaining maximum strength in scarfed joints is to make the length of the scarf about 12 times its thickness. A plain tapered scarf is the usual method, since it is easier to make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and answers most practical purposes. A number of devices have been developed to cut these scarfs, one of which is shown in Fig. 5, indicating the addition of a tilting table on a standard jointer. There are several other types of scarf cutting machines. The important feature in all of these devices is to hold the plywood rigid and flat during the entire cutting cycle. Other scarfing mechanisms arrange to have the cutter head travel on angular or adjustable ways above the plywood on a flat table. In such cases the plywood must be held down firmly on the bed, usually by the suction of a vacuum. The toe of the scarf should not feather out, as such an unsupported cut cannot be made accurately, and it is difficult to glue. The thin end of the scarf should be very slightly blunt, and will be pressed down flush in the hot press.

A functional cross section of a scarfing press is illustrated in Fig. 6. An important feature for a flat tapering scarf is the clamping device at BB, to keep the scarf joint from slipping as the pressure is applied. If electronic heat is used, electrodes would replace the steam platens shown, C. It is the function of the cauls to protect the surface of the plywood from indentation by the edges of the heated platens.

Other shapes of scarfs are in use, two self locking types being shown in Fig. 7, the upper, A, being cuts of unlike contours, while the center, B, has the same contour of cut on each scarf, one of which is reversed in assembly. A rectangular scarf is shown at C, which is a cheaper form largely used for box shooks. Types A and B are self locking and do not require the clamps shown at BB in Fig. 6.

Still another type of scarf is corrugated, and is shown in Fig. 8, where the grooves are parallel to the slope. The cuts are mated, but the cutter head

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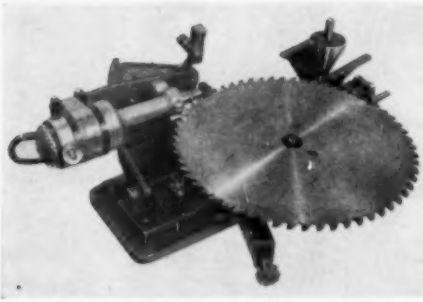

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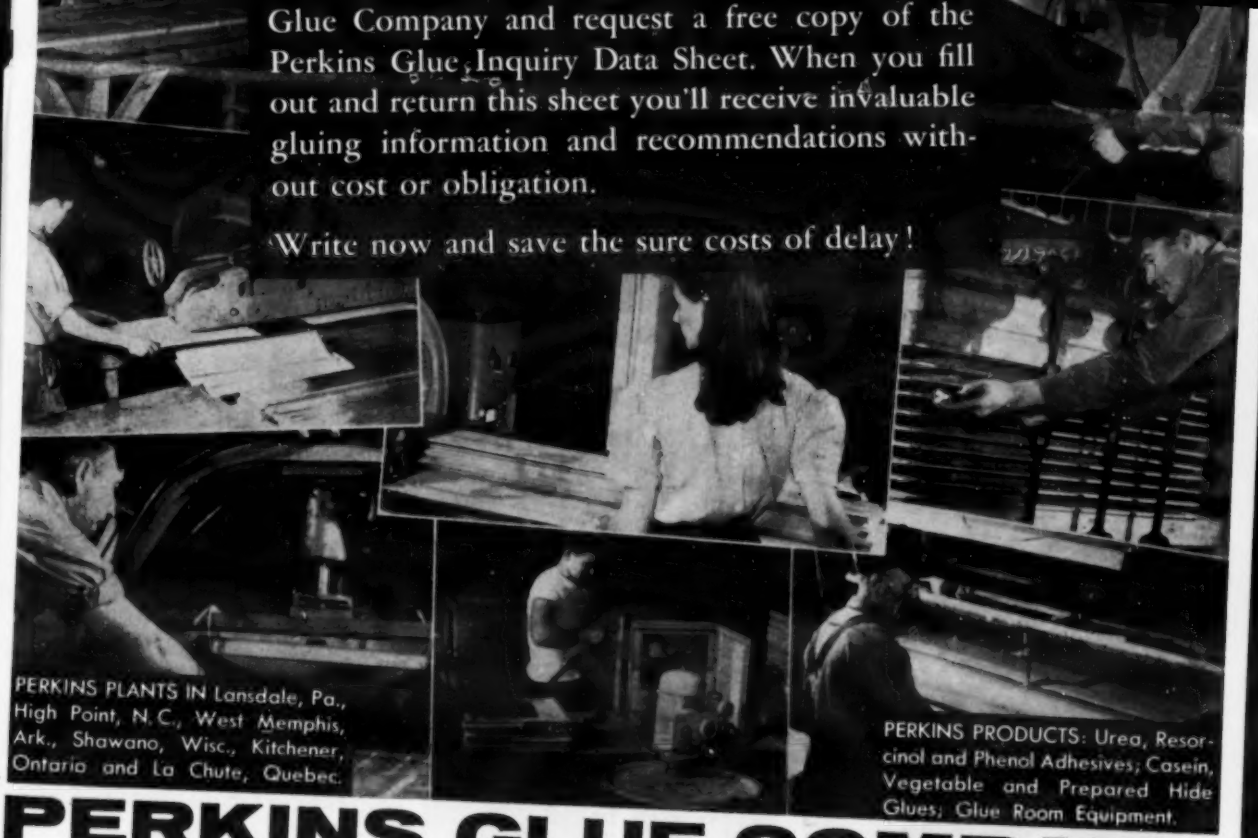

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must travel with the scarf, rather than across it. While this corrugated scarf is favored for strength, some object to its appearance.

Laminated Wood and Timbers

Laminated wood may be somewhat outside the scope of this article, but since the techniques of gluing the layers together are somewhat similar to those of plywood, they may be briefly described. Both exemplify like methods of gluing thinner pieces of wood into thicker members, but in laminated wood, the grain of the wood layers is parallel, while in plywood it is crossed. In fact, veneers are sometimes laid parallel for special furniture products, such as curved legs and backs for chairs, or for rims in grand pianos.

In the case of laminated timbers it is customary to scarf the individual layers endwise, but the edge joints are square. The scarf ratios should be 1/12 for members in tension, but may be reduced to 1/5 in the case of compression loading.

Conclusions

Lumber is a primary product of the log, requiring skill and experience to utilize it effectively. Plywood is a secondary and engineered product, designed to overcome the limitations that are inherent in lumber. Plywood is unquestionably better than lumber in many applications and the phenomenal growth of the plywood industry proves it conclusively.

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DUSTKOPS UNIT TYPE LOW COST — **20 Models** 300 to 3600 cfm ¼ hp to 5 hp

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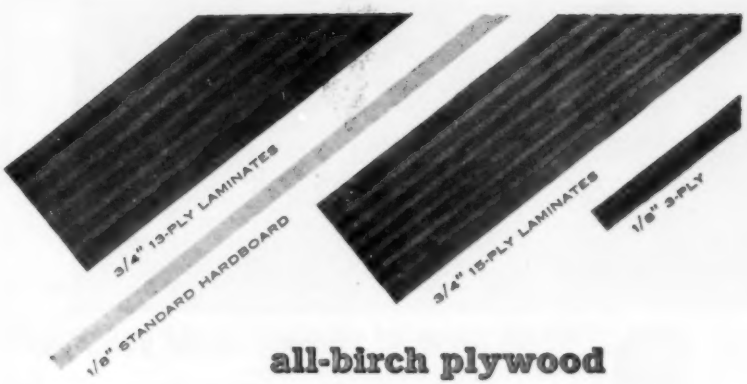


all-birch plywood

From the world-famous forest resources of Finland, imported all-birch plywood—sizes up to 4′ x 6′, all thicknesses . . . cut to size to buyer's specifications. • All-birch ¾″ 13-ply or 15-ply laminates for cabinet doors, table tops, etc.; lumber core for table tops; door panels of birch plywood (¼″ 3-ply). • Also standard hardboard, ⅛″ thickness, with an exceptionally hard surface. • *Dependable deliveries from Finland's oldest plywood source. Quotations submitted—your inquiries invited.*

FINWOOD INDUSTRIES INC. Station Plaza, Ramsey, N. J.

LARGE FLUSH DOOR PLANT OPENS AT CENTER, TEXAS

A flush door manufacturing plant has just been opened by Atlas Plywood Corporation in Center, Texas. Located in the heart of the booming southwest, the new plant, which becomes the company's twenty-fifth manufacturing mill has a completely integrated manufacturing setup. It takes logs in at one end and turns out finished hardwood flush doors at the other end.

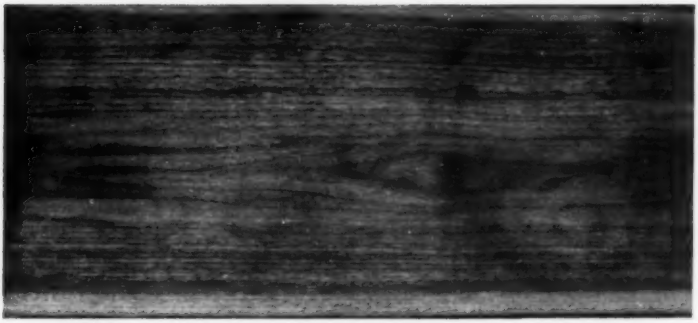
Presently employing 250 workers, the plant is now producing 1,000 doors per day. Later, Atlas Plywood expects to step-up production on a single shift to 1,500 doors daily and to add an additional 150 employees.

CASEIN GLUES

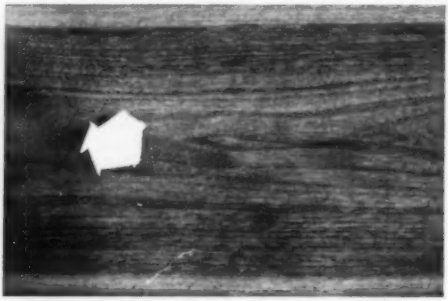
Publication of a new technical folder on casein glue uses has been announced by National Casein, 601 W. 80th St., Chicago, Illinois.

The folder contains general information about casein glue and its uses, temperature, wood preparation, moisture content, mixing, spreading, pressure, staining and storage. Included with the folder are two technical data sheets on No. 1012, a popular veneer glue and No. 30 series casein glue that became known as a millwork glue.

A woman deserves no credit for her beauty at sixteen but beauty at sixty is her own soul's doing.



"Which piece of veneer would you buy?"



You, of course, would buy the veneer without the hole because there would be no waste. Such holes are made by the cleaners who chop around hook holes to clean away any dirt that might nick the knives at the time the log is being sliced into veneer. We have worked out a method of handling logs that eliminates these holes. It takes a little more time in the saw mill, but we feel that the end result and customer satisfaction is well worth the extra effort.

Customers Expect More From STEM and They Get More

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438 GRANT LINE ROAD
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These higher grades of **VENEER** and **LUMBER** manufactured and available at all times

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DON'T Let Them------ GO!

By Ernest Fair

"A GOOD man is hard to find," the old blues singer used to wail and many woodworking plant executive is shaking his head as he mumbles these same words today. The problem of replacing expensively trained men both in the plant and in the office is not an easy one. The readiest solution is to keep them from leaving our staff in the first place!

The inconvenience resulting when an experienced employee suddenly leaves is only part of the story. Usually it takes from four weeks to as many months to properly train a replacement once that individual has been found. The cost reaches a much greater total than we ever realized.

"That happened to me once too often," a veteran executive told us recently, "so I started doing some calculating. It didn't take me long to find that it was costing me a lot more to replace employees than it would have to keep them in the first place.

"Offering extra inducements that will keep my staff together has actually turned out to be a less expensive procedure than replacing them."

His methods of keeping a staff together have worked. So have those of several other executives with whom we have talked. Here are highlights from their combined experience which can be adapted to eacn executive's individual operation to conform to his present system of doing business.

Bonus Program

A bonus program can be used in many ways. One covers automatic raises in salary over definite periods of time; sets down a future inducement to hold employees to the firm.

Another bonus program in use sets up a fund on a profit sharing basis. The amount put into the fund each month is determined by the profit made in the business. This in turn is pro-rated among the employees each three months but if an employee quits his job he forfeits his share for that particular quarter and the amount he would have drawn is distributed among the remaining staff members.

The latter plan forestalls that embarrassing situation where a key employee fails to show up on Monday morning.

No matter what type of bonus program is set up it should contain an element requiring continued employment to receive maximum benefits. Such an inducement gives any staff member pause for thought when he or she thinks about changing jobs.

Pride

Pride in one's firm is something that holds many a man to a job even though he could make a little more money elsewhere. Such pride does not come automatically; the executive must work at instilling it in his staff.

Maintaining a place of business equal to or better than competition is one step; providing the most modern and

best tools with which to work is another. No individual can have much pride in his job or the firm for which he works if everyone knows that it occupies an inferior position in the business community.

Family pride in the employee's job is of immense importance. If a wife has to admit with reluctance where her husband works she will offer him continued arguments as to why he should find another job.

The executive who sees to it that the wife of every employee is a personal friend removes the bogey man created by her having never met him. Many business men are finding it pays to make a social call on every new employee's family soon after they join the staff.

Company picnics or other social affairs which help to bring the whole family into closer touch with the firm also pay dividends. One executive built an enormous amount of goodwill with a contest for employees' wives on ideas for the business. He was amazed at the number of good ones received. Parties for employees' youngsters, sponsorship of boys' baseball clubs to which employees' youngsters belong, an annual dance, and other affairs are easy to stage and cost little.

Clean working conditions "in back" as well as "up front" are important in this respect. Insistence on turning out top quality work, for example, rather than urging short cuts upon workers, will instill such pride.

Compensation

Adequate compensation can always hold good men to any firm. The idea that we can profit in the long run with sub-standard wages seldom holds true in the end. If such an executive will keep records of what it costs to train replacements in work that must be done over, waste, loss of productive time

HENDRICK PANEL SAW
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CHAIN AND SPROCKET DRIVE
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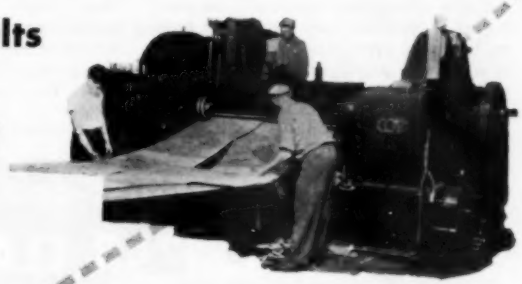

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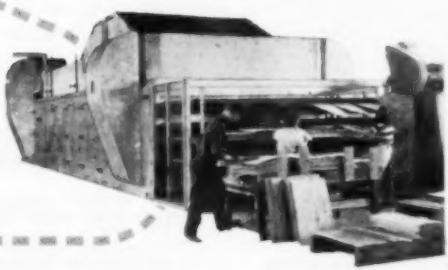

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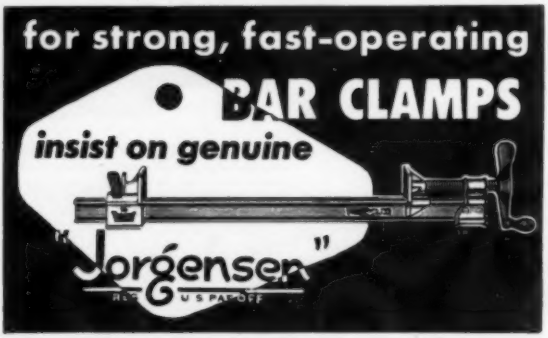
and other factors he will find that his "wage scale" is probably well above that of his competitors in the long run.

In every survey on why people changed jobs this has been a leading factor. No employee can be blamed for a desire to improve financially no matter what loyalties may have been built up toward a given firm. When we cease to offer our employees wages on a par with those they could obtain elsewhere in our community we invite them to leave.

Incentives

Extra incentives often provide the difference in whether or not an employee wishes to remain with our firm. Many such incentives, attractive in themselves to employees, can be presented at low cost by the firm.

Insurance programs are in this category. The big trouble with this type of



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of Humidification is the Key to Eliminating Warping, Checking and Glue Joint Failures

HUMIDIFICATION has a tangible value *only* when it is controlled. To add moisture to the air at random can be just as bad as no humidification at all.

The prime purpose of humidification is to keep the relative humidity at a point where water neither enters nor leaves the wood. Allowing the humidity to rise to 60% at night and then letting it drop 20% or 30%, produces dimensional changes that are the cause of warping, checking and glue joint failures.

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incentive is that employees tend to forget the firm's contribution along these lines. The firm providing any of the various type of insurance programs for its staff should make certain that no member thereof can forget the program. Reminders about the plant, notes in pay envelopes and other steps can serve this purpose.

A well rounded program of other incentives which provide something doing at every part of the year is being used effectively by many firms. These have the added advantage in that most (such as picnics and sports events) can be handled by the employees themselves and the firm is saved this particular administrative expense.

Appreciation

Appreciation is easy to give but so seldom offered to employees. Yet it is of tremendous importance in holding men and women to our staff. In our own lives we avoid people, places or groups wherein we feel that as an individual we are not appreciated. It's natural and it's human!

Our employees have the same attitude. If the extra effort they put forth is never appreciated by their employer they soon develop a feeling of antagonism. A pat on the back costs nothing; just a moment of the boss's time but it has tremendous value to the employee to whom it is given. All of us work harder and with greater loyalty in situations where our efforts receive some extra appreciation.

The greatest effect we can obtain will not come from awards or prizes but personal demonstration of our feelings. When we make awards we set precedents that may create disgruntled situations later.

The job with a future is one to which most men will hold fast. If they can see little chance for advancement in the

future they are certain to look elsewhere.

The executive who talks this over with his employees from time to time gives them such an incentive. This is something we too often expect our employees to see for themselves.

All of these factors are important in keeping our staff together and avoiding expensive employee turnovers. Most important, however, is that we should always make certain each of our employees has one or more good reasons for staying with us; reasons we must supply constantly!

It is easier to increase indignity than to acquire it in the first place.

There is nothing so advantageous to a man as a forgiving disposition.

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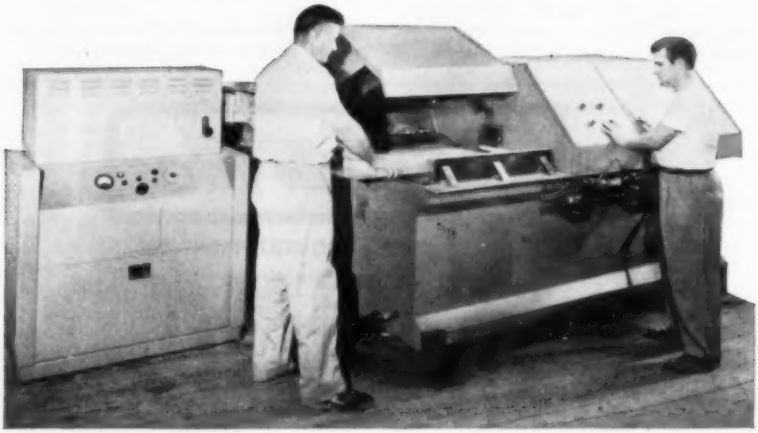
AT DREXEL FURNITURE

One shift does gluing of three with Westinghouse dielectric heating



Westinghouse dielectric heating speeds up glue setting 3 to 1 over other methods at the progressive Drexel Furniture Company's main plant at Drexel, N. C. A Westinghouse 5-kw high-frequency generator, teamed up with a special two position press designed and built by Drexel, is used for a post blocking operation. Using both positions for continuous production, 470 pieces per hour are turned out.

Sanford C. Styres, Drexel Production Superintendent, reports a saving of two complete shifts on this one operation alone. And the glue bond is better—rejects are negligible.

For full information on how dielectric heating can save you money, save you time and improve your product, write Westinghouse Electric Corporation, H. F. Heating Section, 2519 Wilkens Avenue, Baltimore 3, Maryland. J-02291

YOU CAN BE SURE... IF IT'S Westinghouse

PLYWOOD SANDING EQUIPMENT

By Thomas D. Perry

The portion of the former article under this heading, and relating to belt sanders (August, pp. 139, et seq.), inadvertently omitted an important type of belt sander that should be added to those described. This is a double belt type, with traveling pad, in which the two parallel sander belts move in opposite directions. This duplicates, mechanically, the manual operations of hand sanding, where the pad is moved back and forth. When sanding is done in one direction only, the abrasive tends to "raise the grain," leaving a fuzzy surface. This tendency must be neutralized either by sanding in the opposite direction, or by sponging and resanding, or both. This final sanding is with a fine abrasive grit and is usually termed "polishing." It is an operation, in quality finishes that must precede the application of fillers and finish coatings.

This sanding and polishing, with double reversible sander belts, is accomplished in the Oakley line of double belt sanders without moving the stock from the table. This eliminates one entire handling and is a distinct saving in sanding time and cost. It is only necessary to move the traveling pad from one belt to the other to shift from the initial rough sanding to the final polishing. In addition both sander belts are reversible, so that there is maximum flexibility in securing just the sanding treatment that even an unusual figured plywood panel may require for a super smooth surface.

All of the machines illustrated are of the high speed type, with the roughing sander belt running at 7,000 linear f.p.m., and the polishing belt, with the finer abrasives, having a speed of 5,000 linear f.p.m. These speeds are the same in either direction.

The traveling pad, under the control of the operator, moves on parallel steel bars, ½" x 2½" and 9" apart to provide ample rigidity. There is also a pair of in and out ways to shift the pad from the coarse to the fine sander belt. This stroker unit, containing the pressure pad, is of aluminum with a swivel mounting so that the face of the abrasive paper will always be parallel to the plywood. The movement of the pad, by means of the handle, is easy and smooth, requiring a minimum of effort on the part of the operator.

Three types of machines are offered in this line, one being shown in Fig. 1. This has the sliding table integral with the standards that carry the sander belt pulleys, and has sufficient vertical adjustment to permit sanding and polishing a case 28" high. The table is braced by a strain rod below and the machine is offered in standard lengths of 6' 8", 8' 8" and 10' 8" and widths of 36", 48" and 54". It is of the overhead type, with return belt above, and the smooth side of the belt against the pulleys.

Another type, shown in Fig. 2, has an underslung belt with the return belt below and the abrasive side of the sander belt against the pulley. In this machine one end of the sliding table is supported by the standard, and the other end by a pair of floor trunions, giving a more limited height adjustment than is indicated in Fig. 1, but adequate for any thickness of plywood. All types of these sanders are equipped with blow pipe connections at both ends of the sander belts. The machine illustrated

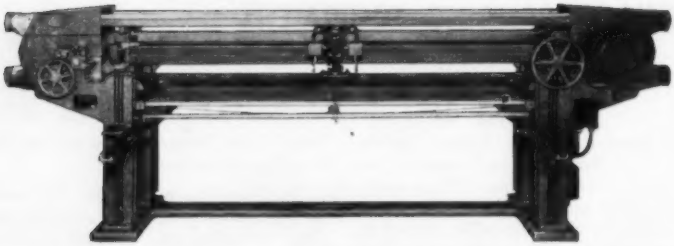


Fig. 1. Oakley double belt reversible sander with overhead belt having integral table.

in Fig. 2 has a standard length of 8' 6", but due to the trunion supports can be supplied in lengths up to 16' 0", for extra long and scarf jointed plywood.

The third type, illustrated in Fig. 3, combines the overhead belt of Fig. 1 with the intermediate trunion supports of Fig. 2. All of these machines are equipped with adjustable stops to control the in and out stroke of the carriage. All have felt sealed dust-proof ball bearings, to insure long life in surroundings where the air is more or less charged with minute abrasive particles. Ample power is provided for high speed operation. The reversible feature of the belts adds substantially to the working life of the abrasive belts.

Conclusions

Combining these belt sanders with

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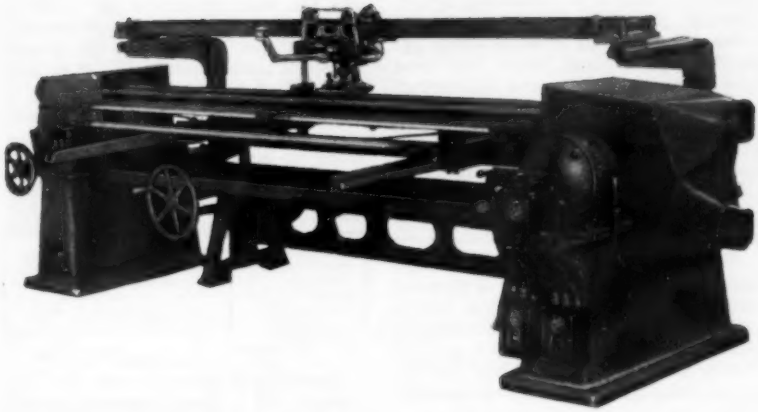

Fig. 2. Oakley double belt reversible sander with underslung belt having table supported by trunions.

Fig. 3. Oakley double belt reversible sander with overhead belt having table supported by trunions.

those described in the preceding article, provides an assortment of equipment offered for sanding plywood which includes the following: single belt hand pad sanders, overslung and underslung; single and double belt sanders with traveling pad, overslung and underslung; single and double belt sanders with automatic stroke, overslung only; single and double belt reversible sanders with traveling pad, overslung and underslung.

Some one of the items in this equipment is suited to every kind of plywood sanding, from the small volume custom work to large production schedules of standard stock panels; as well as from rough sanding to remove tape and irregularities to the finest polish sanding.

With the availability if such a variety of types of belt sanders there is no excuse for the inefficient sanding of plywood. However it remains the responsibility of management: (1) to select the best equipment for a given job; (2) to maintain it in the best working condition; (3) to use the proper grades of sander belts; and (4) to employ skilled workmen.

Many jobs can be done equally well on several of the types described, but there are instances where one type will meet exacting conditions more adequately than another.

The author and editor wish to acknowledge the help of the Oakley Company of Bristol, Tennessee, for supplying data and illustrations for this article on reversible belt sanders.

Discretion of speech is more than eloquence; and to speak agreeably to him with whom we deal is more than to speak in good words.

—**Bacon.**

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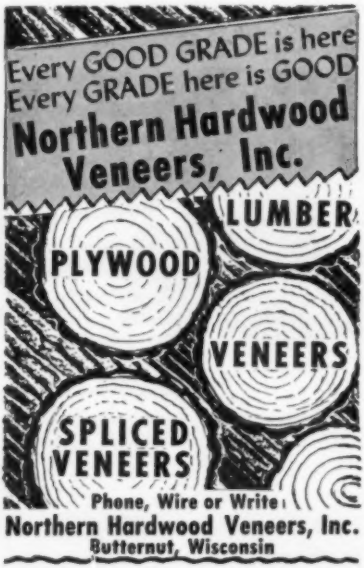

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Figure 321—Lumber Buggy. Large wide tread wheels for outdoor as well as indoor use.

Figure A—Balance style for turning sharp corners. Variety of superstructures and wheel sizes.

Figure 1191—Timber Dolly. Used as a dolly or, inverted as a portable roller.

Figure 2419 and 421—Jacks and Skids. Stores and transports materials with one-time handling. One Jack services many Skids.

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VMT Dovetail Bits in continuous operation for 1,215 hours traveled 42.12 miles cutting 405 thousand 9-ply plywood drawer fronts . . .

A set of VMT Tungsten High Speed Steel Dovetail Bits in a new model 15-spindle Wysong and Miles dovetailer at the David M. Lea & Company, Inc. plant, Richmond, Virginia, established a performance record hard to beat.

Ordinary dovetail bits last from six weeks to 3 months requiring sharpening 2 to 4 times a week and sometimes as often as once a day which means constant change in size of cut.

These VMT bits at the David M. Lea plant were in continuous operation, 9 hours per day for 6 months and 5 days (equal to 1,215 hours and a distance of 42.12 miles) cutting a total of 405 thousand 9-ply plywood drawer fronts. This is tough cutting and calls for some mighty clean and exacting cuts. Sharpening was only required every 2 weeks which meant infrequent change in size of dovetail cut.

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KOPPERS MOVES TERMINAL

Construction of a modern terminal, designed to streamline creosote redistribution operations, and to help promote the recently-initiated Memphis Harbor Project, has been started on Presidents Island, Memphis, Tenn., for the Tar Products Division of Koppers Company, Inc.

The new terminal will be opened around the end of the year and then the company will move its operations from the Memphis waterfront and cross the new causeway to the island. Three huge tanks will be erected on the 10-acre island as well as a building to house service and laboratory facilities and administrative offices.

ENTERPRISE BUYS HOOSIER

The Enterprise Company, Columbiana, Ohio, has purchased the manufacturing and sales rights for the "Hoosier" line of heavy duty band sawmill machinery formerly built by the Sinker-Davis Company of Indianapolis, Indiana. The machines involved are the Hoosier 54-inch band sawmill, 6-ft. band sawmills, the No. 213 self-feed heavy duty gang rip saw, and Hoosier multiple cutoff saws of all types. These machines have had a wide acceptance throughout the lumber industry both in this country and abroad. They will supplement Enterprise's present line of circular sawmills and "Crescent" woodworking machines which the company acquired from the Rockwell Manufacturing Company in 1953.

The Sinker-Davis Company will continue operations in Indianapolis primarily as a contract machine shop and in addition will build the balance of their line of smaller size rip saws, circular sawmills, carriages and general sawmill machinery.

WEST COAST MANAGER FOR WAPAKONETA

B. Scott "Ted" Rinehart has been appointed West Coast Sales Manager for the Wapakoneta Machine Company of Wapakoneta, Ohio. Rinehart is headquartered at Portland, Oregon, and will manage sales in the Rocky Mountain area. The Wapakoneta Machine Company has manufactured machine knives, shear blades and cutters since its founding in 1891.

STOWELL-MacGREGOR INSTALLS NEW PREFABRICATED DRY KILN

The Stowell-MacGregor Division of Coats & Clark, Inc., recently installed a new prefabricated dry kiln at their Dixfield, Maine, mill.

These kilns were engineered and manufactured by the Standard Dry Kiln Co., who furnished not only the kiln equipment, but the kiln building itself completely fabricated at their plant and assembled under their supervision at Dixfield.

This kiln is a double track end piling kiln with fans and heating system overhead and the kiln is approximately 24' wide and 32' long. The building itself is made up of aluminum vapor proof panels with an insulation value on the side walls of 25" of brick and the 3" panel roof is equivalent to 41" of brick in insulation value.

Mr. H. A. Patterson, manager of the plant, says they are experiencing considerable steam saving and the quality of drying is very excellent. These kilns were installed with local labor under the supervision of the Standard Dry Kiln Company engineer and the building and equipment were installed in three weeks after the cement footings were poured.

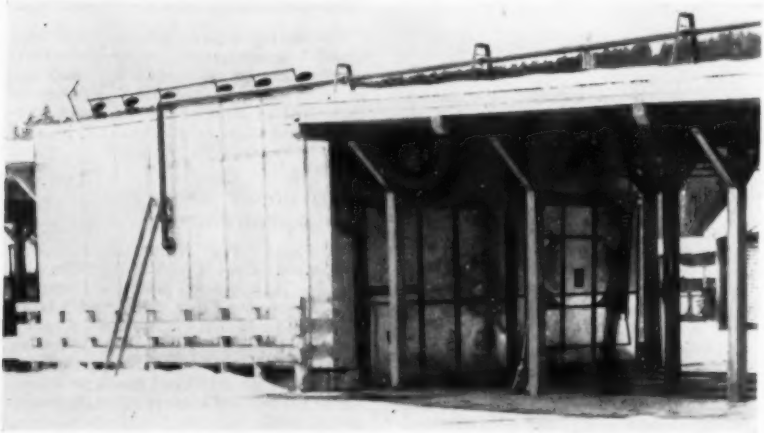
The kiln has doors at both ends and the Stowell-MacGregor Co. put a covering shed over both ends of the kiln so that not only the green lumber but dry lumber is under-shed immediately after it comes from the kiln.

This is the fourth internal fan kiln installed for Stowell-MacGregor by the Standard Dry Kiln Company, Indianapolis, Indiana.

CANADIAN FIRM TO U.S. PLYWOOD

The United States Plywood Corporation has acquired Canadian Plywoods, Ltd., the largest independent wholesale plywood distributor in Canada.

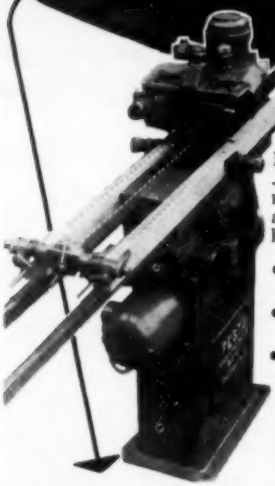
Canadian Plywoods, Limited has a plywood warehouse distributing unit in Montreal which, together with a U.S. Plywood subsidiary's unit at Toronto, will now be operated as Weldwood Plywood, Limited, a wholly-owned subsidiary of the United States Plywood Corporation. Acquisition of Canadian Plywood is described as the first step in a planned expansion program to develop a chain of plywood warehouses in Canada. U.S. Plywood now operates five plants in Canada.



High Speed . . . Fully Automatic

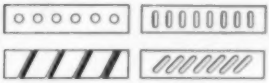
Festo LOUVER STILE MORTISING & BORING MACHINE

Model JFA



Extremely fast . . . efficient . . . automatic machine for mortising grooves for stationary louver-slats and boring holes in rolling blind-stiles.

- Simple to set-up and change-over.
- Stiles bored or mortised in pairs at high speed.
- Top quality work assured by advanced engineering, expert craftsmanship, and fast spindle speed.



90 Grooves per Minute

Write for Complete Information

Festo FESTO WOODWORKING MACHINES

745 51st Street Brooklyn, N. Y.

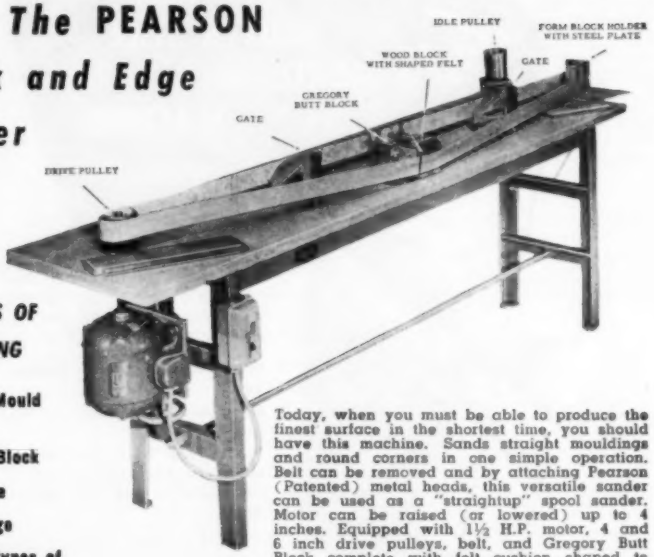
FURNITURE MANUFACTURERS ORGANIZATION

Formation of a new furniture manufacturing and sales representative organization, known as Mark Tauber & Sons, was announced as of September 1, 1954. Headquarters have been established in space 730 of the American Furniture Mart. Mr. Tauber, Sr., resigned from executive positions with the Cambridge Furniture Corporation and the Ashley Furniture Corporation to join this new firm.

The new organization will act as the national selling medium for an affiliated occasional furniture manufacturing firm known as JEM Furniture Corp., and will be national sales representatives for a number of other lines of occasional furniture manufacturers. Tauber & Sons will shortly announce a new type of merchandising service for medium priced furniture stores throughout the country.

"A prudent man is like a pin; his head keeps him from going too far."

Faster, Smoother Sanding With The PEARSON Block and Edge Sander



5 TYPES OF SANDING

Stationary Mould Block

Hand Slide Block

Curved Edge

Straight Edge

Spool (All types of curves)

Today, when you must be able to produce the finest surface in the shortest time, you should have this machine. Sands straight mouldings and round corners in one simple operation. Belt can be removed and by attaching Pearson (Patented) metal heads, this versatile sander can be used as a "straightup" spool sander. Motor can be raised (or lowered) up to 4 inches. Equipped with 1½ H.P. motor, 4 and 6 inch drive pulleys, belt, and Gregory Butt Block complete with felt cushion shaped to fit any one mould. Length of belt is 19 feet; table 24 inches wide. Overall length is 11 feet.

We Also manufacture Scroll and Drum Sanders.

Write for Complete Data

PEARSON SANDING MACHINE CO., INC.
HIGH POINT, N. C.

F.P.R.S. MEETINGS

Fall meetings still to be held by sections of the Forest Products Research Society include:

October 11-12—Carolinas-Chesapeake Section Meeting, Grove Park Inn, Asheville, N.C. Sessions will stress subjects on design; causes and control of end waviness in drying veneer; new developments in adhesives and wood finishes; developments in woodworking machinery and specifications for wooden pallets.

October 25-26 — Pacific Northwest Section at Corvallis, Oregon.

October 28 — Northern California meeting at Chico, Cal. Speakers will include Dr. George Jamison and Peter Field.

October 28-30—Florida-Georgia-Alabama meeting at Auburn, Ala.

November 2-3 — Upper Mississippi Valley meeting, School of Forestry, University of Minnesota, St. Paul, Minn. Program theme is wood integration and will include a panel discussion.

CUT FINISHING
COSTS 50%!
AIR MODEL
J-R
$69.50
DETROIT Easy FINISHERS
DO ALL THE JOB!
PROVEN TOPS for sanding white wood, water-fall fronts, sealer coats - SEALING END GRAIN - padding in filler - rubbing final coats. There's no substitute for EASY Straight-Line Action.
FREE TRIAL
Ask your Jobber or write us.
Model DF
Electric
Model AF
Larger Air
For working hard to get at areas, simply adjust pad up to 1½" either side.
Ask Your Jobber or Write for Catalog.
DSM
DETROIT SURFACING MACHINE COMPANY
1278 E. Eight Mile Rd. Detroit 20, Mich.

November 4-5 — Northeast section meeting at Prince George Hotel, New York City. Topic is "What's New In Wood Use."

December 1-2 — Great Lakes section meeting at Grand Rapids. Discussion will center about the use and production of high speed detail machines in the woodworking industry.

"Chances are the woman who doesn't gossip has no friends to speak of."

A.W.I. GROWS

The Architectural Woodwork Institute, founded in October 1953, has more than doubled its membership. There were 63 members a year ago and now 265 special millwork manufacturers are in the group. The second annual convention of the organization is being held October 15-16, LaSalle Hotel, Chicago.

"What every home needs is a phone with a built-in bathtub."

IMPROVED No. 90A Series
WILLSON MonoGoggle

Wider, Deeper Frame Gives Greater Clearance Over Spectacles

We've taken the popular Willson MonoGoggle® design and made it with a deeper and wider pliable, transparent vinyl frame with grooves molded into the sides for extra roominess over glasses. It provides protection against light impact hazards on such operations as spot welding, buffing, wood working and chemical handling.

Ask your Willson distributor to show you the new No. 90A Series MonoGoggles, available with either direct or indirect ventilated frames or non-ventilated styles. Or write for bulletin.

Side view shows molded-in grooves in sides of frame provide ample clearance for spectacle temples — removes interference with eye glass comfort.

WILLSON

WILLSON PRODUCTS, INC., 123 Thorn Street, Reading, Pa.

INATTENTION!

A foreman was injured the other day when walking past a lumber truck. The driver of the lumber truck apparently did not see the foreman passing by and released the chain holding a load just at that time, and one tier of planks fell causing contusions of the right arm and right side, and fracturing three ribs on the right side.

This accident should not have happened, since at least two good men were responsible for it. The driver, who was a no-accident driver with a ten year record, was extremely inattentive in releasing a load without being sure no one was nearby who might be injured. The foreman, being deeply engrossed in a conversation with one of his men, was not aware of the possibility of such a thing happening. Both will now be more attentive, but one at the cost of a broken accident record, and the other at the cost of broken ribs.

JOB HAZARD ANALYSIS

By Stanley J. Butcher*

Here is a practical approach to the study of safety within the average woodworking plant.

JOB hazard analysis might be defined as a study of the operation to determine the necessary mechanical protection and personal actions for prevention of accident and injury.

Safety directors seem to be frightened by the term "job hazard analysis." Some of the top safety men with whom I have discussed this matter, have claimed that it was too time consuming and required too much detail. As a matter of fact, I doubt that any of them had given it much thought, let alone a trial. When we get right down to it, what are we trying to do? Prevent accidents and worker injuries! By analyzing a job and determining what the possibilities of hazard are, we can set up work methods to prevent the accident and injuries. Rather than try to deduct how it happened from reports and comments of injured persons and witnesses of an accident, we can anticipate the possibility of accident and put preventive measures into effect.

Time Saved

The time spent in accident investigation could be used to more advantage in job hazard analysis. Possibly the pattern which is generally followed in the development and conducting of a plant safety program, while effective, should be a follow-up of job hazard analysis rather than preliminary to it.

Briefly sketching the normal procedures in setting up a plant safety program, let us use as an example a plant where management (through pressure from the insurance company, the home office, the union, or some other source) decides to put in a safety program.

Someone (usually a supervisor) is made responsible for the safety program. Next, a safety committee is formed; the supervisors are called together and told that they are the key men in this program and bear the responsibility for keeping their departments safe and having the employees under their direction work safely "Okay, fellows, now let's really do a good job on this safety program and stop these accidents!"

With this simple organization, the men are sent out on the job without the essential tools to do the job assigned

*Supervisor, Special Industry Program, Bureau of Labor Standards.
Mr. Butcher's material was presented at the 1953 National Safety Congress.

to them. It may be true that these supervisors have had years of experience but it does not necessarily follow that this experience has included the safety angle.

Safety Tools Needed

The safety tools needed to do this work safely might be termed safe work methods.

I wonder if our safety achievement in this industry wouldn't have made much better and quicker progress if it had been started with job hazard analysis of each operation and machine so that the safe work methods and safe conditions could have been used by the employess on these specific jobs; by the foremen in instructing employees and checking on the use of the safe methods, and by the safety supervisors in checking on the foremen? First, we should have developed the safety tools, safe work methods, to give to the workers and supervisors to help them in doing a good safety job.

A project for example, is to develop safety tools for use with a Universal cutoff saw. While there are several different ways of approaching job hazard analysis, from the complicated survey as made in time and motion studies to the simple "step and hazard" form, we would choose a rather simple form which indicates the steps, mechanical hazards, personal hazards, and protective measures.

Then follows an actual analysis of the saw operation in various positions—cross cut, angle cut, rip, rabbetting.

* * *

THE CIRCULAR SAW

The circular saw is probably the most useful of woodworking tools, but it is also the most dangerous. Bad cuts, amputation of fingers and even death have all been caused by careless use of the circular saw. Here are some of the obvious checking points. Examine them in connection with the use of the circular saw in your own plant.

Then analyze your own operations with the saw. If Mr. Butcher's idea is followed, you may find several things that should be done to make the circular saw a safer operation in your plant.

For safest use, the rim speed of a circular saw must not exceed 12,000 f.p.m., unless the saw has been manufactured or hammered for a higher speed and is so marked. When a circular saw is turning at high speed, the teeth are almost invisible. Even a slight brush with the saw may mean a dangerous cut. Therefore, we guard the saw.

The saw should be equipped with a hood that will cover the saw to at least the depth of the teeth. This hood should automatically adjust itself to the thickness of the material being cut and remain in contact with it, unless the hood is in a fixed position. Then the space between the bottom of the guard and the material being cut must be no more than half an inch.

The exposed parts of the saw blade under the table must be guarded. There should be a clear view of the saw at the point of operation. Of course, the guards should be designed and constructed so that vibration is prevented.

SWING CUTOFF SAWS

Swing cutoff saws must have a device to return the saw automatically to the back of the table when released at any point. Fibre rope or cord must not be used in the device for this purpose.

Limit chains, positive stops or table extensions must be provided to prevent the saw from swinging beyond the front edge of the table.

Where it is possible to pass behind a swing cutoff saw, the rear of the saw must be completely housed when the saw is in its back position. The housing must include the swing frame as well as the saw.

MANUAL-FEED RIPSAW

A hand-feed ripsaw must be equipped with a splitter or spreader to prevent pinching or binding. It must be slightly thinner than the saw kerf and slightly thicker than the saw disc.

Anti-kickback devices of steel should be designed and installed so as to be effective for material of all thicknesses.

Remember This

All the teeth should be even in length. The blade should not be lumpy or warped.

The depth, size and shape of the gullets should be such as to let all sawdust discharge freely. The bottom of the gullet should be round.

The cut in the wood should be a trifle wider than the thickness of the saw blade.

A saw must be discarded if it has a crack longer than 5% of the diameter, unless the diameter is reduced to eliminate the crack and the tension is corrected.

Please Mention
WOOD WORKING DIGEST
When Writing
Advertisers.

UNIFORMITY OF SASH PATTERN IS YOURS... *INDEFINITELY*

when you use

SHIMER SASH HEADS

WITH LONG-LIFE CIRCULAR BITS

You can produce and reproduce sash moulding patterns without a variation . . . clearance protected Shimer circular bits hold their shape indefinitely! They're quick, easy to sharpen, designed for all-around clearance cut! Long runs or short—cut your sash mouldings the economical Shimer way and pocket extra profits!

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SAMUEL J. SHIMER & SONS, Inc.
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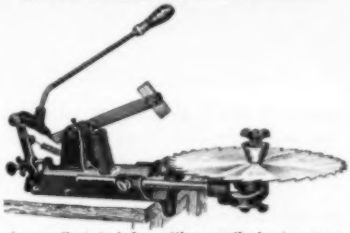
SHIMER

SIMPLEX
CIRCULAR SAW SETTING MACHINE



An excellent tool for setting small circular saws. The successful operation of all circular saws depends largely upon the manner in which they are fitted.

To obtain the best results the teeth should be properly and evenly set.

This machine does the work perfectly, insuring easy and true running and smooth cutting.

The hammer strikes every blow with equal force and at the same angle hence the set of each tooth is absolutely uniform. Will give a light, medium or heavy set.

Adjustable for saws, either rip or cut-off, from 8" to 24" in diameter.

The machine will last for years if handled with ordinary care and intelligence.

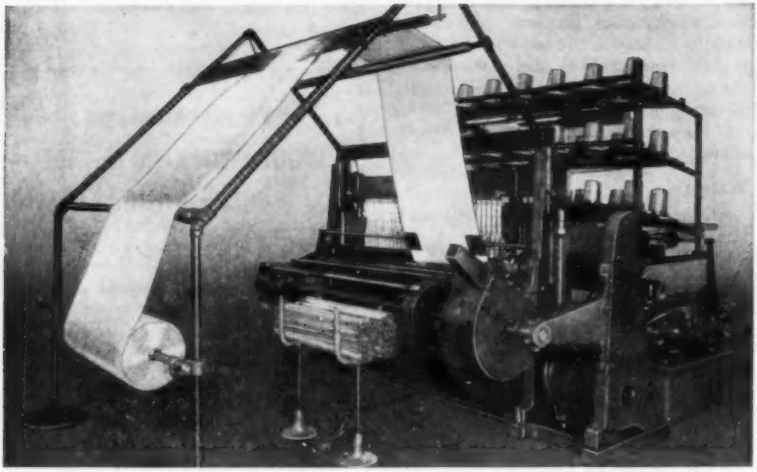
Further details upon request

ZEILLER & NAGEL, INC.
232 JAVA BROOKLYN, N.Y.

SARANAC *Specialized* FASTENING MACHINES SOLVE PROBLEMS

CASE HISTORY NO. 2

1500% CUT IN LABOR COSTS WITH THIS SARANAC MACHINE!



REPEAT: 1500% REDUCTION in labor costs resulted on the average when this specialized Saranac Wire Stitching Machine was installed in a number of plants. Bear in mind too, that great savings are made when any of the *standard* Saranac Machines go to work . . . *for one of them might solve a cost-cutting problem for you!*

IN THIS CASE, the machine staples wood cleats to the canvas belt conveyors used on grain combines . . . and does it so successfully that nearly all combine harvester manufacturers have one or more Saranac Staplers like it!

IF YOU HAVE A FASTENING PROBLEM, consult Saranac—the leader with fastening "know-how." Describe your problem and send samples of your material. We'll cooperate fully.

SARANAC MACHINE COMPANY
BENTON HARBOR, MICHIGAN

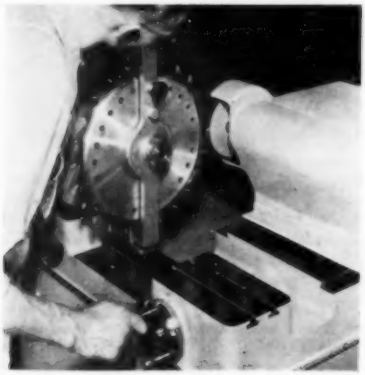
Manufacturers of the World's Largest Line of Fastening Machinery

EQUIPMENT and Supplies for the WOODWORKING INDUSTRY

REDCO TOOL GRINDER

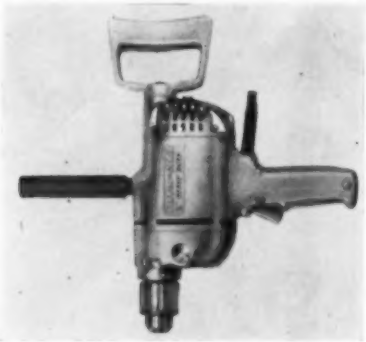
Illustration shows a close-up of the Redco saw grinding attachment used with the Redco tool grinder to provide fast, accurate resharpening of carbide tipped woodworking saws. This attachment, designed by woodworking specialists of the Redco Tool Division, Red Lion Cabinet Company, Red Lion, Pa., enables the operator to rapidly resharpen carbide tipped saws.

The versatile Redco tool grinder, in addition to its use with the saw grinding attachment, can be equipped to resharpen carbide tipped cutter heads, router bits, grooving cutters and other straight cutting woodworking tools. With the precision profile attachment, the Redco grinder can be adapted to make as well as resharpen high speed steel and carbide tipped profile knives separately or while assembled in a moulder or shaper head, thus assuring knives which track and give maximum cutting efficiency.



NEW ½" DRILL

A new heavy-duty ½" electric drill has a powerful 6-ampere motor that develops 45% more chuck twist power



than other leading drills in its price class, according to Locked-Rotor Torque tests by the manufacturer,

Porter-Cable Machine Company of Syracuse, N. Y.

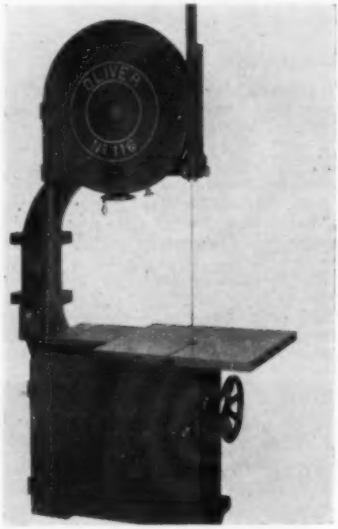
The drill, Model 516, weighs 10 pounds and measures 14¼" long, 3½" wide and 9⅞" high. The rear spade-type handle is adjustable for vertical or horizontal position, or may be removed entirely in cramped quarters. An auxiliary two-position handle permits the operator to apply more pressure and maintain accuracy. A trigger switch provides finger-tip control, with a push button lock for one-hand operation. The drill has a ½" gear type chuck for positive slip-proof grip on bits. Bit capacity is rated at ½" for steel and 1⅜" in wood.

POWERMATIC PLANER

The Powermatic Model 100-12" planer is a completely redesigned 12"x5" single surfacer, rugged enough for heavy production planing. Exclusive roller mounting greatly reduces roller and bearing wear and improves efficiency of machine. The machine is manufactured by the Powermatic Machine Company, McMinnville, Tenn. Other outstanding features include: 2" feed rolls controlled by positive action clutch mounted conveniently on front of machine. Feed mechanism driven by V belts from cutter head eliminating gear transmissions for trouble free drive: 3" 3-knife safety type cutter head (mounted in sealed for life ball bearings) turns 4400 r.p.m., with a feed rate of 15 f.p.m., 73 knife cuts per inch are realized for extremely smooth finishes. One piece cast iron frame assures perfect alignment at all times. The 12"x24" cast iron table is equipped with two idle rolls for friction free operation. Close fitting chipbreaker and pressure bar may be adjusted while machine is in operation.

EXTRA CAPACITY BAND SAW

The Oliver Machinery Co., Grand Rapids 2, Michigan, is offering a special band saw. This machine has 36" diameter wheels and is driven by 5 h.p. motor built directly on the lower wheel shaft. Capacity under the guide is 35". The wheel speed is 720 r.p.m., giving a blade speed of 6780 f.p.m.



There are many times when a saw with this extra capacity, most band saws have a capacity of 22" or 23" under the guide, can be utilized to advantage.

FLEXIBLE SHAFT MACHINE

A new inexpensive hang-up type flexible shaft machine is being made by the Stow Manufacturing Co. of 130 Shear St., Binghampton, New York. This model B38 can be furnished with either a ¼ or 1/3 h.p. motor with speeds of either 1725 r.p.m. or 3450 r.p.m. Either 5 or 6 foot flexible shafts may be obtained. This machine can be used for grinding, buffing, sanding, wire brushing, polishing and drilling in wood. This machine gives plenty of power for doing all these operations without fatiguing weight.

In combination these machines can also be used for multiple drilling operations.

WETZLER BAND CLAMPS

Wetzler band clamps are designed for clamping any regular or irregular shape. They are ordinarily supplied with an exceptionally strong pre-stretched canvas band of about 2,000 lbs. tensile strength. If greater pressure is necessary on objects with round or oval contour, a steel band can be furnished which provides for a tensile strength up to 3000 lbs. Standard canvas bands

Y18 is the only Machine That Sharpens Cross Cut Saws in One Operation

Its patented and exclusive automatic swivel enables each tooth to be filed correctly as it comes along. Insures accuracy, keeps bevels true, points balanced and saw in perfect cutting circle.
Sharpen your saws, both cross cut and rip with Y 18, and *speed your productivity.*
Please write for Bulletin Y 18

WARDWELL
Maker of largest line of saw and tool sharpening machines

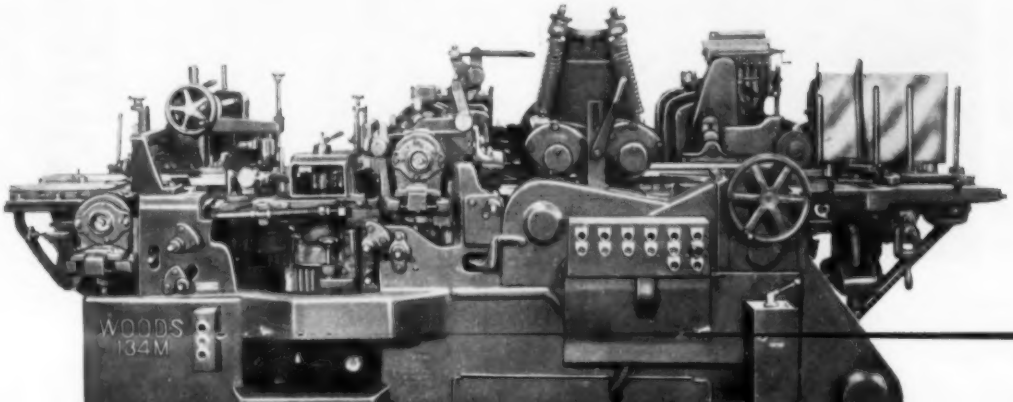
Manufacturing Company
3806 Ridge Road
Cleveland 9, Ohio

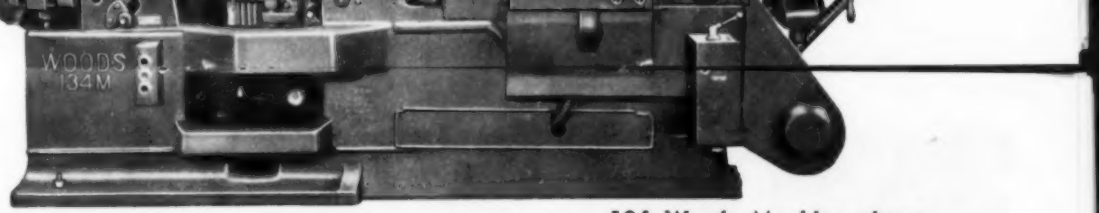
Serving the Industry Since 1852

It's Marvelous!

This "LAG BED" MOULDER

built by "The Moulder of Woods"®





134 Woods Moulder, shown with hopper feeding attachment

Production depends on DESIGN!

A machine is no better than its design. Over one hundred years of designing know-how on wood working machines is behind the Wood's 134 Moulder. It was designed and custom built with one goal in mind—to offer you a Moulder that will "out do" and "out last" any other Moulder in its field. Space here does not permit telling you of all the exclusive features that make this 134 Moulder so outstanding. An inquiry from you will bring detailed information.

S. A. WOODS MACHINE CO.

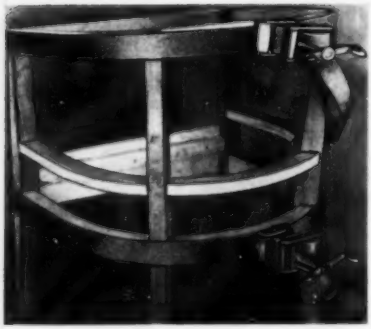
27 DAMRELL STREET

BOSTON 27, MASS.

Branch Offices: ARK., Little Rock CALIF., San Mateo N.Y., Mount Vernon ORE., Portland TENN., Memphis VA., Richmond

Canadian: B.C., Vancouver, Akhurst Mchy. Co. ONT., Galt, Canada Mchy. Co.

Export Dept. United States Machinery Co., 90 Broad St., New York City



are 2" and 3" wide. Lengths range from 10 to 30 feet.

A positive lock mechanism prevents all play and backlash, assuring tautness at all times. The clamps are manufactured by the Wetzler Clamp Co., 43 Eleventh St., Long Island City 1, N.Y.

ATLAS GRINDER-HONE

The Atlas No. 2400 is a unique new sharpening tool—a combination grinder and hone that quickly and easily puts a perfect edge on almost any tool. This grinder-hone is manufactured by the Atlas Press Co., 3027 N. Pitcher St., Kalamazoo, Mich.

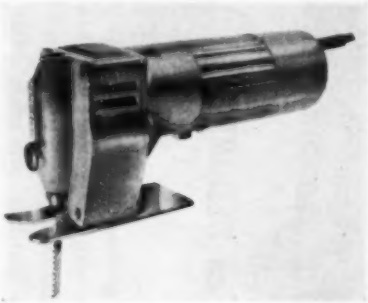
Plane blades, chisels, jointer blades, screw drivers, scrapers, drills and tool bits—there's almost no end to the list of tools and implements the new Atlas will keep "factory sharp."

Accurate sharpening is no trick at all with the combination grinder-hone. Merely move the blade across the grinding wheel and oilstone — the grinder turns 3,000 r.p.m., oilstone speed is reduced to 110 r.p.m. by a worm and worm gear. Constant speeds and sturdy adjustable tool rests assure a perfect cutting edge every time.

The grinding wheel is 6" diameter medium grit aluminum oxide for all-round grinding efficiency. Oilstone is 5" diameter, sandwich type, with grits of 120 for whetting and 320 for final honing to keenest possible edge. Oilstone is instantly reversible.

LESTO SAW

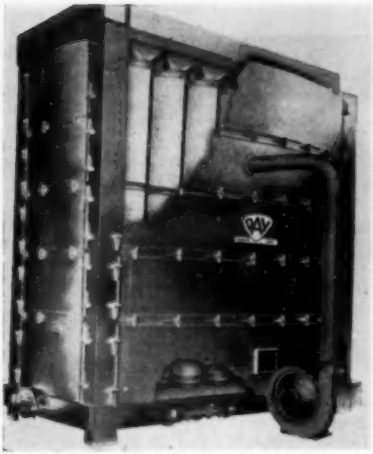
Victor J. Krieg, 611 Broadway, New York City, announces the Lesto electric



hand saw model GEB 13. This saw offers a slower moving blade than their other models. The GEB 13 has a 1" stroke and a maximum sawing thickness up to 1½". It is ideal for cutting fancy curves, insertions, etc., and can be used as a rip, scroll, band, jig, crosscut, coping or keyhole saw (within the scope of the material being sawed, of course).

DUST FILTER INSTALLED

The Day Company, Minneapolis, Minnesota, announced the production of the 500th "AC" (Hersey Type) dust filter.



The 500th unit is now under installation at the E. I. Du Pont de Nemours & Co.'s Wilmington, Delaware plant. Mr. R. E. Gorgen, Day Company executive vice-president points out that this is the sixth installation of this type of Day equipment for du Pont.

Day dust filters have been well received by manufacturers in a wide range of activity. Units are now in use in plants handling materials ranging from grains and starches to radioactive materials, abrasives and chemicals. According to Mr. Gorgen, industry's acceptance of the Day (Hersey Type) dust filter is demonstrated by the fact that 73% of the users have placed orders for additional filters. He also noted that the Day filters now in service are cleaning over 250,000,000 cubic feet of air every hour.

NEW OFFICE

A. G. Johnson, Jr., has opened an office at 666 Lake Shore Drive, Chicago, to sell hardwood dimension stock, plywood and wood products in the American Furniture Mart. Among the mills represented are: Angelina Hardwood Sales Co., Lufkin, Texas and Madison Woodworking Company, Canton, Miss.

FOLEY FILED SAWS

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New Model 61

Only the best SAW SHARPENING can give you top-speed production. The Foley Saw Filer quickly puts old saws with dull and irregular teeth back in perfect condition—and keeps them perfect! 25% to 40% increase in production is frequently realized with Foley-filed saws.

ONE machine files cross-cut circular saws, band saws, hand saws.

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permits you to use a Foley Saw Filer in your own shop. You can't lose on this offer—write or send coupon.

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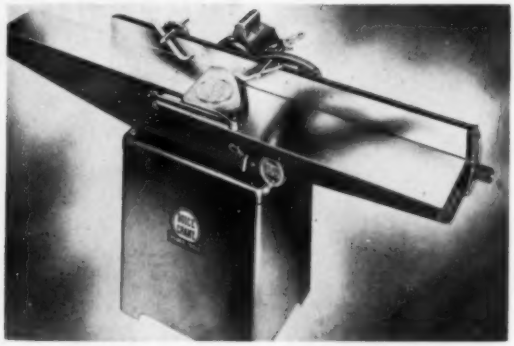
LONG-TABLE JOINTERS



Long-table jointers, which include still further improvements on the 8" x 84" and 6" x 60" all-steel jointers, have been announced by the Boice-Crane Company.

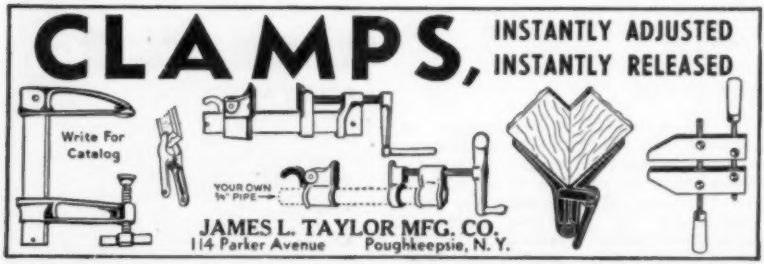
One of the important improvements is in the fence control handle. The knob-type hand grip located midway along the top of the fence, which simplified and speeded up angular fence setting and for years has been an exclusive feature with Boice-Crane, has been replaced with a long, cast, inverted U-type which provides the operator increased control of the fence, with no interference when feeding stock through the machine.

The Boice-Crane 6" and 8" jointers are of welded, all-steel construction and have the longest fences of any 6" or 8" jointers and the longest tables of any 8-inch jointers. They are rugged enough for planing mills and, at the same time, accurate enough for the most demanding cabinet makers.

Adequate support for narrow rabbetting on wide stock is provided by the full length support of the rabbetting side of the infeed table. Both tables are simultaneously ground flat and parallel to closest limits after all members have been permanently welded together.

The 3¼" diameter head (3⅜" cutting circle), is 20% larger than with conventional 6" jointers. The 8" jointer has 4 knives and the 6", 3 knives, delivering 14,400 and 10,800 cuts per minute respectively.

The depth of cut control, two table locks, direct reading depth scale and



switch are all conveniently grouped at the front. There are no projecting switches, exposed wiring or bulging projections to interfere with comfortable working.

When rabbetting, the guard stays on the machine. It is simply swung out of the way.

With these machines, Boice-Crane offers a line of three job-rated jointers, an 8" x 84", recommended for stock up to 16' long and up to 8" wide or thick; a 6" x 60" recommended for stock up to 12' long and up to 6" wide or thick; and a 6" x 36", recommended for stock up to 8' long and 6" wide or thick.

ADDS LIFE TO SANDING BELTS

Superior cutting solvent increases the working efficiency of any piece of sanding equipment by permitting quick and easy cleaning of abrasive linings and belts. Rub on with a brush and accumulations of pitch and dust virtually disappear. The effective life of sanding belts is more than doubled and changeover time is sharply reduced.

The solvent works equally well on drum, disc and spindle sanders, sanding belts and blocks. When used on saws or feed rollers, it eliminates the necessity for scraping and leaves absolutely no stain or oily film to discolor the wood. Non-toxic and completely safe to use, it is available from Superior Laboratories, 117 Sherman Ave., East Williston, N.Y.

CUTOFF SAW GAUGE

An accurate, quickly-set cutoff gauge for use in cabinet shops, wood window screen manufacturers, crating and shipping departments, trailer manufacturers, detail millwork, all types of wood shops and repair shops, etc., is now being offered by Snow Manufacturing Co. of Los Angeles. The manufacturer also announces the appointment of Clark & Sawyer, Inc., 2012 E. 7th St., Los Angeles 21, California, as national distributors.

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RIPS AND CROSS-CUTS
2 INCH PLANKS

MODEL NO. 2

WHIZ-SAW #2, one of the most versatile cutting tools ever invented, cuts with amazing speed . . . wood, bone, plastic, fibre, asbestos board, pressed wood, hard rubber, etc., up to 2 inch thicknesses. Ideal for all craftsmen. The original WHIZ-SAW #1 cuts up to 1 inch thickness. ($55.00) WHIRL-SAW, 4½ inch circular blade, cuts up to 1¾ inch thickness. ($49.00)

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THE Forsberg MFG. CO., BRIDGEPORT 1, CONN.

Makers of the Famous Whale & Viking Tools

Known as the Snow cutoff gauge, this tool is said to be a tremendous time, energy and material saver for any shop requiring the measuring of materials for cutting. It can be set in a matter of seconds, for any cutting length up to 9'. The accurate scale, ruled in sixteenths, is fastened permanently to a sliding bar which moves freely when the operating bar is lifted, but locks firmly in place by means of three cams when the operating bar is pressed down. All settings can be instantly made by the operator without moving from his position in front of the saw.

The gauge is designed to fasten to front of table or bench, leaving top clear except for the stop arm itself. The measurement indicator is located directly in front of operator, making the large clear numerals easy to see and helps to eliminate errors and waste. Because of this, random length cuts may be made accurately, and almost as fast as production runs of one length.

MOLDED PLASTIC WHEEL PROTECTS FLOORS

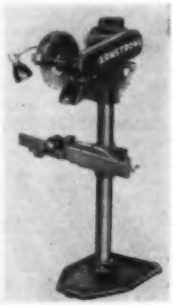
A moulded plastic wheel, said to be floor protective under extreme loads, has been developed by the Hamilton Caster & Mfg. Company, 1700 Dixie Highway, Hamilton, Ohio.

According to the company, the wheel is noiseless, nonsparking, and shock-absorbent. Structurally equal to semi-steel wheels, the Hamilton molded wheel is capacity-rated to 2,000 lbs., and will outwear metal wheels in many operations. Equipped with roller bearings and Zerk lubrication fittings, the wheels are available in sizes ranging from 4" to 12" in diameter.

The company, in addition, manufactures a wide range of rubber-tired and steel wheels, forged and plate-steel casters of all types, as well as industrial floor trucks, dollies, lift truck systems and barrel skids.

HAND SHARPENER

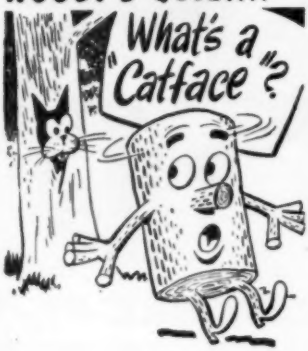
A new hand sharpener with a capacity for either rip or cutoff saws from 6"-60" in diameter has just been announced by Armstrong Manufacturing Co. The sharpener is said to have several new design features that will allow more precision sharpening as well as cutting down on sharpening time.



The Armstrong hand sharpener permits sharpening saws to a full 60" in diameter without cutting a hole in the floor or putting the machine on a pedestal. The operating handle is located in a convenient position for comfortable operation, permitting clear vision of the work.

The machine is furnished complete for motor drive, with a ½ h.p. 110 volt, single phase, 60 cycle motor and starting switch as standard equipment. Further information on the new No. 54 Armstrong Hand Sharpener may be obtained from Armstrong Manufacturing Co., 2135 N.W. 21st Avenue, Portland 8, Oregon.

WOODY'S QUIZ....



In loggers' lingo a "catface" is a partly healed scar on the trunk of a tree. A catface usually is caused by fire.

Loggers' terms may differ from region to region. But, North, South, East, or West, all agree that man-caused fires are one of the forests' worst dangers. Each year forest industries spend millions of dollars in preventing, locating and suppressing woods fires. You can help by always being careful with fire in or near the woods. Keep our state green.

A Tree Farm is private forest land growing repeated timber crops for use

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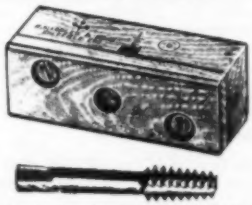

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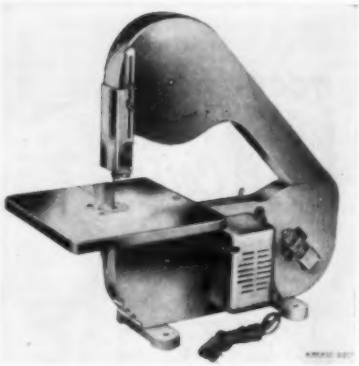
OPERATOR'S BOOKLET

The fifth edition of the popular "How To Operate A Lift Truck" has been published by Hyster Company, 2902 N.E. Clackamas St., Portland, Ore., and is now available again free to lift truck operators, supervisors, safety engineers and other interested industrial and governmental personnel.

BURGESS BAND SAW

Portability is a feature of this new band saw. Sturdily built of cast aluminum and steel for extra strength without extra weight, the new band saw may be used in the workshop, or can easily be carried to location. Compact three-wheel design gives maximum capacity, yet takes up minimum space.

The Burgess band saw has a full 12" throat depth. Cuts can be made to the center of pieces 24" wide, any length. Thickness capacity under blade guide is 3¼". Blade guides and guard adjust



instantly without special tools. Cast aluminum table measures 10" x 10".

The built-in motor is blower-cooled, and has self-lubricating bearings. Smooth, quiet, positive chain drive eliminates need for troublesome pulleys and belts. Sturdy base has convenient holes for mounting on workbench, table, or stand. All-purpose spring-tempered blade is included with the saw.

The band saw is being manufactured by Burgess Vibrocrafters, Inc. in their new plant at Grayslake, Illinois.

TABLE SLIDE HARDWARE

A new and improved dinette and dining room table slide line is currently available to the trade by the Allied Tube Corporation, manufacturers of dinette table hardware and accessories.

Allied table slides are in several style models for leaf openings of 8" - 10" and 12". The table slides are engineered on a friction free motion of smooth rivet roller action between two slide sections. Steel-ite washers offer a minimum of play between the sections of the two piece slide. The slides will not swell, warp or bind and are rigidly constructed.

Complete literature and samples are available upon request by writing the Allied Tube Corporation, Juniper and Walnut Streets, Philadelphia 7, Pa.

ADVANCEMENTS IN SPRAYING

Putting more "automatic" into automatic spray coating machines describes two new inventions of D. J. Peeps, engineering vice-president of the DeVilbiss Company, Toledo, Ohio, manufacturers of spray painting equipment. The inventions have been assigned to the company.

One invention is designed to move spray guns in synchronization with an article being sprayed and returning the guns to a starting position so another article can be coated in the same manner.

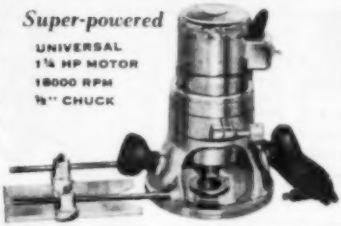
The most important factor of the invention is the positive rapid return movement of the spray guns to the starting time. The invention aids in the maintenance of high production by making the return movement rapid and unvarying.

The other invention is a signalling device which is operated pneumatically. This device is designed to actuate the spray guns when an article is present on the conveyor-supports of the automatic machine. If the support is empty, the device will not actuate the gun. The operation of the signalling device is dependable in transmission because of the pneumatic operation. Detecting devices operated mechanically sometimes fail to give a signal if the article on the spindle is too light.

HURRICANE PORTABLE ROUTER

Super-powered

UNIVERSAL
1¼ HP MOTOR
18000 RPM
½" CHUCK



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As early as
THE REIGN OF THE ANCIENT ROMAN EMPEROR CLAUDIUS, THERE WAS A STRONG GUILD OF BLACKSMITHS PLYING THEIR CRAFT IN BRITAIN.

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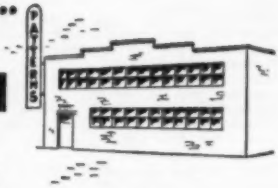
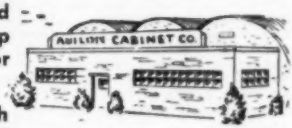
Moak Hand Planers and Jointers





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Tungsten steel knives are fitted in the high carbon alloy steel cylinder head, the head mounted in self-aligning ball bearings enclosed in dust-proof housings. Available in sizes for planing 12″ and 16″ lumber; equipped with ½″ rabbeting groove, adjustable bevel gauge and hand brake for safety.

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about equipment and supplies as featured by our advertisers in this particular issue. All of our advertsers will be glad to send information about their products, but we have listed the following firms because they have mentioned booklets in their advertising copy.

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Minnesota Mining & Mfg. Co., page 117, Booklet.

ADHESIVES
Rohm & Haas Company, page 11, Literature.

BITS & DRILLS
Greenlee Bros. & Co., page 26, Folder M-159.
Forest City Bit & Tool Co., page 50, Catalog.
Virginia Machine Tool Co., page 162, Catalog.

CLAMPS
Handy Mfg. Co., page 57, Catalog.
Hargrave, page 66, Catalog.
Hartford Clamp Co., page 97, Catalog.
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J. L. Taylor Mfg. Company, page 180, Catalog.

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Tayler, Stiles & Co., page 67, Catalog.
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DUST CONTROL SYSTEMS
Kirk & Blum Mfg. Co., page 107, Literature.
Aget-Detroit Company, page 146, Catalog 605a.

ELECTRON TUBES
Machlett Laboratories, Inc., page 141, Literature.

FACTORY TRUCKS
Nutting Truck & Caster Co., page 161, Literature.

FASTENERS
United-Carr Fastener Corp., page 7, Sample.
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Wm. Patent Crusher & Pulverizer Co., page 23, Brochure.
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Bahnson Company, page 103, Booklet.
Armstrong Machine Works, page 153, Bulletin 1775.

JOINTERS
Atlas Press Company, page 18, Literature.
Moak Machine & Tool Co., page 187, Folder.

MOLDERS
Fay & Egan Company, page 80-81, Brochures.

MORTISERS
Greenlee Bros & Company, 91, Bulletin 227.

MOTORS
S. A. Woods Machine Co., page 41, Literature.

NAILING MACHINES
G. M. Diehl Machine Works, page 8-9, Bulletin N-454.

PLANERS & SURFACERS
Buss Mach. Works, inside back cover, Bulletin.
B. D. Whitney & Son, page 13, Bulletins.
Enterprise Company, page 58, Bulletin 204.
Fay & Egan Co., page 80-81, Brochure.

PLYWOOD
Hardwood Plywood Institute, page 130, Booklet.

PLYWOOD PRESSES
Columbia Division, page 132, Bulletin HP-2.

PORTABLE ELECTRIC TOOLS
Skil Corporation, page 19, Literature.
Porter-Cable Mach. Co., page 47, Manual.
Black & Decker Mfg. Co., page 77, Catalog.
Chicago Tool & Eng. Co., page 185, Circular J6w.

PUTTY
Donald Durham Co., page 124, Sample.

RESAWS
Mereen-Johnson Machine Co., page 20-21, Bulletin 2108.

ROUTERS
Porter-Cable Mach. Co., page 47, Manual.
Chicago Tool & Eng. Co., page 185, Circular J6w.

SAFETY EQUIPMENT
Wilson Products Co., 168, Literature.

SANDING MACHINES & EQUIPMENT
Mattison Machine Works, back cover, Literature.
H. B. Smith Mach. Co., page 2, Literature.
National Air Sander, Inc., page 27, Catalog.
Sand-Rite Mfg. Co., page 120, Circular.
Ekstrom, Carlson & Co., page 127, Bulletins.
Detroit Surfacing Machine Co., page 167, Catalog.

SAW BLADES, SAWING MACHINES & EQUIPMENT
Oliver Machinery Co., page 1, Bulletin 94-DH.
B. D. Whitney & Son, page 13, Bulletins.
Tannewitz Works, page 30, Bulletins.
A. W. Forrest Mfg. Co., page 56, Brochure.
Enterprise Co., page 58, Bulletin.
L. S. Starrett Company, page 128, Bulletin.
Hendrick Mfg. Co., page 150, Brochure.

SAW SHARPENERS
Huther Bros. Saw Mfg. Co., page 143, Catalog CT100.
Wardwell Mfg. Co., page 175, Bulletin Y18.
Foley Mfg. Co., page 179, Literature.

SCHOOLS
Kick Institute, page 185, Folder.

SHAPERS
B. D. Whitney & Son, page 13, Literature.

TABLE EQUIPMENT
B. Walter & Co., page 97, Sample.

WOODWORKING, general
Woodworkers' Tool Works, page 106, Catalog.
Rudolf Bass, Inc., page 183, Catalog.

The Market Place

Rates for Classified Advertisements

Lists of Used and Rebuilt Machinery, either For Sale, Wanted, or For Exchange, set in uniform style, will be published in the Classified Section at the rate of $7.50 for name and address and a five line advertisement. For additional lines, only 75c per line.

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Clippers, Coe 88" bd. & motor
Dovetailers, Dodds, 10 & 20 spindle
Frequency changers, 30 KW dmd. and 15 KW.
Glue Jointer, Diehl No. 66 bb. dmd.
Glue Jointer, Jenkins No. 343A bb. dmd.
Jointers, Glue, Yates-American No. 213 bb. dmd.
Jointer, New Moak 12", bb. dmd.
Lathe, Yates No. 74 bb. dmd.
Lathes, Mattison 55C and 57D
Lathe Heads, Mattison Hex. T-slot
Mortiser, Sidney, single spindle pb. bd.
Mortiser, Greenlee No. 228 Vert. bd. & motor
Mortiser, New Britain No. 7, bd. & motor
Mortiser, W&M No. 288—5 spdle. Horiz. dmd.
Moulders, Hermance 7" pb. bd.
Moulders, Mattison No. 222, 6" bb. dmd.
Moulders, Woods No. 107—12" pb. bd.
Moulders, Yates-American C-4—8" bb. & motor
Moulders, Yates-American C-89—6" bb. dmd.
Planer, Facing, Yates-American 36" with Jackson & Church feeder on base, bb. dmd.
Planer, Whitney 36" sgl. rd. hd., bb. dmd
Planers, F&E—36" dbl. pb. bd. & motors
Planers, Berlin 36", rd. hd. dmd.
Planers, New Crescent 24" bb. dmd.
Planer, F&E No. 156 36x7 dmd. rd. head
Planer-Matcher, Yates A1-15"x6" rd. hds. pb. bd.
Redrier, Merrit 12 plate 36x72
Routers, Ekstrom Carlson No. 232 & Yates American A9 bb. dmd
Router, Defiance, 2 spindle bb. dmd.
Routers, Defiance sgl. spdle. high speed. dmd.
Sander, New Jefferson, hand block, bb. dmd.
Sanders, Mattison No. 134, pb. bd.
Sanders, Niagara brush, bb. dmd.
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Sander, Smith 49" 3-drum endless bed, bd.
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Pico Automatic Double End Dovetailer
Wysong & Miles No. 290 Auto. Dovetailing Mach.

GLUE SPREADERS

54" Union Dble. Rubber Roll Resin Glue Spreader

GRINDERS

Covel-Hanchett Band Saw Grinder
Practically New Stetson-Ross No. 372 Grinder

JOINTERS

Diehl No. 660 Glue Jointer, Direct Motor Drive
Practically New Porter 36" Normalizer
Porter No. 300 Facer
Yates-American No. 213 Direct Motor Driven Glue Jointer
24" Yates-American No. 1 Jointer

LATHES

Yates-American 42" No. 74, mtr. dr., ball bearing
Yates-American 36" T-5, motor driven, ball bearing
Mattison 42" No. 57-D motor drive ball bearing
Mattison 36" No. 55-C motor drive, ball bearing

MATCHERS

Woods 412M electric planer & matcher
Woods 501M Direct Motor Drive, Ball Bearing Hardwood Flooring Machine
American No. 53 End Matchers
Yates A-1 Planer & Matcher

MORTISERS

Wysong & Miles No. 284 direct motor drive, ball bearing single spindle mortiser
Wysong & Miles No. 288 direct motor driven 6-spindle mortiser
Wysong & Miles No. 286 Hinge Seat Mortiser
Wysong & Miles 6-Spindle No. 268 Mortiser

MOULDERS

Yates-American 6" No. C-75 electric moulder
Newman 12" No. 412 Electric Moulder
Woods 508M 4" Electric Moulder
Yates-American 4" Type C-88 Electric Moulder
Newman 6" No. 46 Electric Moulder
Yates-American 9" No. 35 Electric Moulder
Practically New Stetson-Ross 8" Type 48-K Fast Feed Electric Moulder, with hopper feed
Hayes Sash & Door Sticker w/Plowing & Boring

SINGLE PLANERS

Buss 40" direct motor drive, ball bearing
Greenlee 36" No. 110 Direct Motor Driven
Porter No. 300 Facer
Whitney 30" No. 32 Direct Motor Driven Ball Bearing Planer
Yates-American 30" No. 1 Jointer with Hersog Feeder

DOUBLE PLANERS

Buss 36" Double Planer
Yates-American 36" No. 177 ball bearing, direct motor driven with electric grinder
Whitney 30" and 36" No. 34 direct motor driven ball bearing, with grinder and jointer
24" Woods 54-M

SANDERS

Mattison No. 124 Automatic Stroke Sander
Pearson Waterfall Sander
Oakley Model H Drawer Sander
Nash No. 50 and No. 25 Turning Sander
49" Yates-American DMD Endless Bed Sander

BAND SAWS

Mershon 46" Band Resaw
American 44" Band Resaw
Yates-American 36" Type Y-36 motor drive, bb.
36" Yates-American Motor Driven Ball Bearing Band Saw
Yates-American Type V-54 Roller Brg. Band Resaw
Berlin 44" No. 283 Band Resaw

CUT-OFF SAWS

Beach No. 3 Roller table double cut-off saw
Bell No. 24-B Double End Sawing, Boring and Chucking Machine
Fay & Egan No. 501-A Direct Motor Driven Ball Bearing Swing Saw
Eaglesfield Direct Motor Driven Ball Bearing Swing Saw

RIP SAWS

Eaglesfield Direct Mtr. Dr. Ball Brg. Rip Saw
New Marion Glue Joint Rip Saw, in stock here
Mattison No. 202 Glue Joint Rip Saw
Mattison No. 207 Direct Motor Driven Ball Bearing Glue Joint Rip Saw
American No. 15 Ball Bearing Chain Feed Rip Saw
Yates-American G-67 Chain Feed Rip Saw

ROUTERS

Yates-American U-5 Electric Router

SHAPERS

Whitney No. 251 Double Spindle Electric Shaper
Whitney No. 234 Double Spindle Electric Shaper
Whitney No. 235 Double Spindle Automatic Shaper
Onsrud W-125 Double Spindle Automatic Shaper
Onsrud W-125 Single Spindle Automatic Shaper

TENONERS

Yates-American No. 2½ Electric Tenoner
Jenkins No. 95 Electric, double-end

VENEER MACHINERY

Francis 76" Hydraulic Veneer Clipper
Dennis Veneer Taping Machine, Motor Driven
Frances 84x36" hydraulic veneer press, M.D., with booster pump and overhead cranes
Merritt 13 Plate redrier 60 by 36

MISCELLANEOUS

Salstrom 18-spindle Carver
Ekstrom-Carlson late mod. M.D. BB bedlock mach.
Wardwell Saw Filer
Morgan 7-track open back nailer with clincher
Williams Motor Driven No-Knife Hog
New Raiman Automatic Knot hole borer & plugger
Leitelt Lumber Lift

Sutton WOODWORKING MACHINE CO.

PHONE 2-4186 SEDGEFIELD INN GREENSBORO, N. C.

PRODUCTS INDEX

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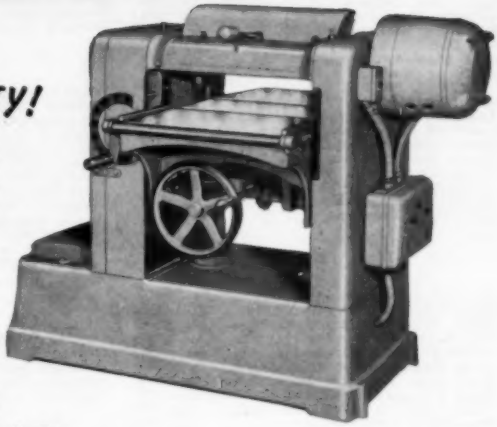
NEW

NORTHFIELD

No. 2 SINGLE SURFACER

HERE'S A LITTLE BEAUTY!



ALTHOUGH the smallest surfacer in the line, it's still a heavy, well built, smooth running machine, with all the traditional Northfield performance and dependability. It features a greatly simplified and trouble free mechanical design.

It will take material 18" wide and from 1/8 to 8" thick, at variable speeds of from 26' to 60' per minute. Highly recommended for manual training shops, sash and door, and furniture plants.

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HIGH SPEED, PRECISION

- Band Saws
- Surfacers
- Wood Shapers
- Jointers
- Saw Tables
- Mortisers (Chain & Hollow Chisel)
- Universal Woodworkers

The NORTHFIELD Guarantee

We guarantee perfect satisfaction to anyone who may purchase our machines, and if any reasonable exceptions are taken to their good performance, they may be returned at our expense.

Northfield FOUNDRY & MACHINE CO.

★ ★ ★ NORTHFIELD, MINNESOTA, U. S. A.

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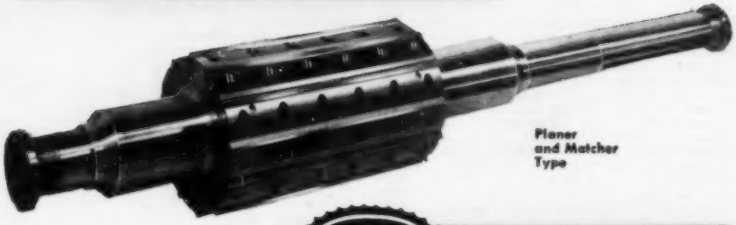
PUT NEW PRODUCTION LIFE IN YOUR OUTDATED WOODWORKING MACHINES WITH



Planer and Matcher Type

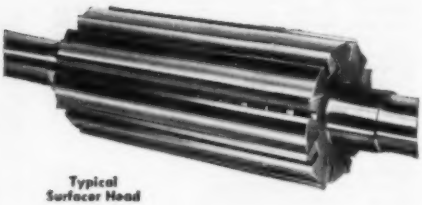
BADGER JOURNAL HEADS

FOR JOINTERS, SURFACERS,

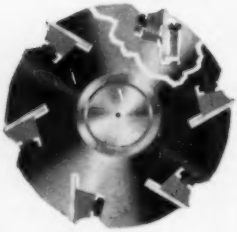
PLANERS AND MATCHERS

Badger Journal Heads are tailor-made to fit any existing machines, babbitt or ball bearing. Made of finest alloy, steel forgings, all-in-one-piece, precision machined and ground, and dynamically balanced. Available from 4 to 14" cutting circles with from 2 to 20 knives and equipped with reliable Badger High Speed Thin Knives.

Note ease of knife alignment adjustment provided by adjusting screws.



Typical Surfacer Head



REVITALIZE YOUR TIRED WOODWORKING EQUIPMENT!

Badger Journal Heads are made to your exact specifications. Our engineers will gladly assist in re-equipping outmoded machines with modern high production heads. Many conversions from babbitt to ball bearings are worked out.

When ordering, give complete information for type of machine; diameters of cutting circle, and shaft extensions; journal length; number of knives; direction of rotation and R.P.M.; type, number and size bearings to be used.

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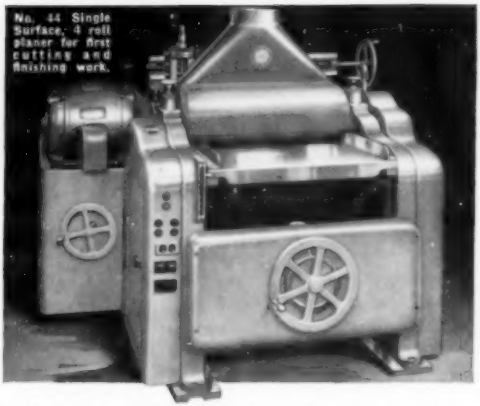
BELOIT WISCONSIN

Engineers to the Woodworking Industry

Eliminate

THE THIEF IN YOUR PRODUCTION LINE


No. 44 Single Surface, 4 roll planer for first cutting and finishing work.

that old planer that seemingly plugs away so faithfully. Sure it keeps on running and does a fair job, but it soaks up many times the man and machine hours that a modern BUSS Cabinet Surfacer would require to do the same work better. And that means it is constantly robbing you of a good share of your profits.

Consider for a moment that Modern Buss Surfacers provide finest finish planing at speeds as high as 80 f.p.m. . . . that most adjustments are made semi-automatically and instantaneously, in just a fraction of the time required on the older machines . . . also that the knives on these machines can be kept in perfect condition with relatively little time and effort. These are just a few of the many advantages that Buss Machine Works, through its many years of specializing in the building of planers EXCLUSIVELY, has been able to incorporate in their present surfacers.

THERE'S A BUSS PLANER TO EXACTLY SUIT YOUR NEEDS

No. 1-L Single Surface, medium sized planer for first cutting and finishing work.

No. 66 Single Surface, 6 roll planer for first cutting and finishing work.

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MICRO-SURFACER for planing hardboard and other very thin materials.

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SINCE 1862
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PLANER SPECIALISTS EXCLUSIVELY

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202

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FAST FEED
STRAIGHT LINE RIPPER

Here's why so many woodworkers standardize and recommend the 202.

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You can rip silver edgings which will not jam.

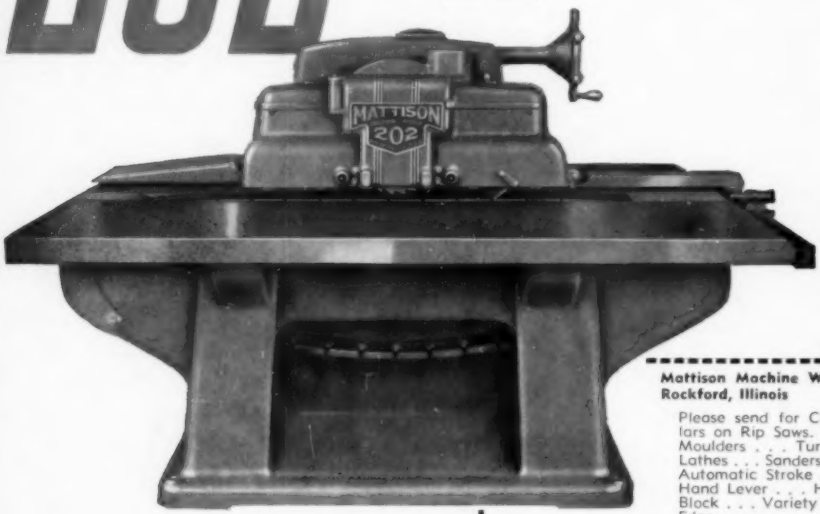
Smaller size saw blades can be used:
14" saw cuts 4" lumber
9" saw cuts 1" lumber

Hardened wear-resisting track and chain blocks.

Yielding Gauge saves lumber and assures faster edging and ripping.

Patented saw jointing and side dressing device.

Provides straight-edge accuracy for glue joint work.



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Rockford, Illinois

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